IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

Overlooking the Carrizo Badlands along the wind caves trail in Anza-Borrego Desert State Park.
https://www.hikespeak.com/trails/wind-caves-trail-anza-borrego-desert/

June 26, 2014
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

FINAL REPORT

August 24, 2018

TABLE OF CONTENTS

SECTION PAGE

I Introduction 1
I.1 Demonstration Contents 2
I.2 Requirements of the Exceptional Event Rule 2
I.2.a Public Notification that a potential event was occurring (40 FR §50.14(c)(1)) 3
I.2.b Initial Notification of Potential Exceptional Event (INPEE) (40 CFR §50.14(c)(2)) 3
I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v)) 3
I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(c)(3)(i)) 4
I.2.e Necessary demonstration to justify an exclusion of data under (40 CFR §50.14(c)(3)(iv)) 4

II June 26, 2014 Conceptual Model 5
II.1 Geographic Setting and Monitor Locations 5
II.2 Climate 17
II.3 Event Day Summary 20

III Historical Concentrations 29
III.1 Analysis 29
III.2 Summary 33

IV Not Reasonably Controllable or Preventable 34
IV.1 Background 34
IV.1.a Control Measures 35
IV.1.b Additional Measures 36
IV.1.c Review of Source-Permitted Inspections and Public Complaints 36
IV.2 Forecasts and Warnings 39
IV.3 Wind Observations 40
IV.4 Summary 40

V Clear Causal Relationship 42
V.1 Discussion 42
V.2 Summary 53

VI Conclusions 55
VII.1 Affects Air Quality 55
VII.2 Not Reasonably Controllable or Preventable 55
VII.3 Natural Event 56
VII.4 Clear Causal Relationship 56
VII.5 Historical Norm 56

Appendix A Public Notification that a potential event was occurring (40 CFR §50.14(c)(1)) 58

Appendix B Meteorological Data 105

Appendix C Correlated PM_{10} Concentrations and Winds 120

Appendix D Regulation VIII – Fugitive Dust Rules 125

LIST OF FIGURES

FIGURE PAGE

Figure 2-1 Colorado Desert Area Imperial County....5
Figure 2-2 Surrounding Areas of the Salton Sea....6
Figure 2-3 Jacumba Peak....7
Figure 2-4 Anza-Borrego Desert State Park Carrizo Badlands....8
Figure 2-5 Anza-Borrego Desert State Park Desert View from Font's Point....9
Figure 2-6 Location and Topography of Imperial County....10
Figure 2-7 Deserts in California, Yuma and Mexico....11
Figure 2-8 Monitoring Sites In and Around Imperial County....12
Figure 2-9 Salton City Air Monitoring Station....13
Figure 2-10 Salton City Air Monitoring Station West....14
Figure 2-11 Naval Test Base Air Monitoring Station....14
Figure 2-12 Naval Test Base Air Monitoring Station West....15
Figure 2-13 Sonny Bono Air Monitoring Station....15
Figure 2-14 Sonny Bono Salton Sea National Wildlife Refuge....16
Figure 2-15 Sonoran Desert Region....18
Figure 2-16 Imperial County Historical Weather....19
Figure 2-17 GOES-W Visible and Infrared Satellite Images June 26, 2014....21
Figure 2-18 Daily Weather Map on June 26, 2014....22
Figure 2-19 Ramp-Up Analysis June 26, 2014....23
Figure 2-20 NOAA HYSPLIT Model 0100 PM June 26, 2014....25

Figure 2-21 NOAA HYSPLIT Model 0300 PM June 26, 2014....26

Figure 2-22 NOAA HYSPLIT Model 0900 PM June 26, 2014....27

Figure 2-23 72 Hour PM_{10} Concentrations Regional Sites....28

Figure 3-1 Brawley Historical Comparison FRM and FEM PM_{10} 24 Hr Avg Concentrations January 1, 2010 to June 26, 2014....30

Figure 3-2 Brawley Seasonal Comparison FRM and FEM PM_{10} 24 Hr Avg Concentrations April 1, 2010 to June 26, 2014....31

Figure 3-3 Brawley Historical FRM and FEM PM_{10} 24 Hr Avg Concentrations January 1, 2010 to June 26, 2014....32

Figure 3-4 Brawley Seasonal FRM and FEM PM_{10} 24 Hr Avg Concentrations April 1, 2010 to June 26, 2014....32

Figure 4-1 Regulation VIII Graphic Timeline Development....35

Figure 4-2 Permitted Sources....38

Figure 4-3 Non-Permitted Sources....39

Figure 5-1 Suspended Aerosols Over Imperial County....43

Figure 5-2 CONUS Infrared Satellite Image June 26, 2014....44

Figure 5-3 Time Sequence of Entrainment June 26, 2014....47

Figure 5-4 72 Hour Wind Comparison of Regional Sites....48

Figure 5-5 Brawley PM_{10} Concentrations and Wind Speed Correlation June 26, 2014....49

Figure 5-6 Brawley 72 Hour PM_{10} Concentrations and Wind Speed Correlation....50

Figure 5-7 72 Hour PM_{10} Concentrations and Wind Speeds Regional Sites....51

Figure 5-8 72 Hour PM_{10} Concentrations and Visibility El Centro NAF (NKJK)....52

Figure 5-9 Air Quality Index for Brawley June 26, 2014....53

Figure 5-10 June 26, 2014 Wind Event Takeaway Points 54

LIST OF TABLES

TABLE PAGE

Table 1-1 Concentrations on PM_{10} on June 26, 2014 1

Table 2-1 Monitoring Sites in Imperial County, Riverside County and Arizona June 26, 2014 17

Table 2-2 Wind Speeds on June 26, 2014 24

Table 5-1 Wind Speeds and PM10 Concentrations for Brawley June 26, 2014 45

Table 6-1 Technical Elements Checklist Exceptional Event Demonstration for High Wind Dust Event (PM_{10}) 55

ACRONYM DESCRIPTIONS

AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HF	Historical Fluctuations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
LST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar
NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service
PDT	Pacific Daylight Time
PM10	Particulate Matter less than 10 microns
PM2. 5	Particulate Matter less than 2. 5 microns

PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan

I Introduction

On June 26, 2014, the State and Local Ambient Air Monitoring Station (SLAMS) located in Brawley (AQS Site Code 06-025-0007), California measured an exceedance of the National Ambient Air Quality Standard (NAAQS). The Federal Equivalent Method (FEM), Beta Attenuation Monitors Model 1020 (BAM 1020) measured a (midnight to midnight) 24-hr average Particulate Matter less than 10 microns (PM_{10}) concentration of 185 $\mu g/m^3$. PM_{10} 24-hr measurements measured above the 150 $\mu g/m^3$ are exceedances of the NAAQS. The SLAMS in Brawley was the only station, in Imperial County to measure an exceedance of the PM_{10} NAAQS on June 26, 2014.

TABLE 1-1
CONCENTRATIONS OF PM_{10} ON JUNE 26, 2014

DATE	MONITORING SITE	AQS ID	POC(s)	HOURS	24-HOUR CONCENTRATION $\mu g/m^3$	PM_{10} NAAQS $\mu g/m^3$
6/26/2014	**Brawley**	**06-025-0007**	**3**	**24**	**185**	**150**
6/26/2014	Niland	06-025-4004	3	23	130	150

All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted[1]
June 26, 2014 was not a scheduled run day

The Imperial County Air Pollution Control District (ICAPCD) has been submitting PM_{10} data from Federal Reference Method (FRM) Size Selective Instruments (SSI) since 1986 into the United States Environmental Protection Agency's (USEPA) Air Quality System (AQS). Prior to 2013 all continuous measured PM_{10} data was non-regulatory, thus measured in local conditions. However, by 2013 ICAPCD began formally submitting continuous FEM PM_{10} data from BAM 1020's into the USEPA managed AQS. Because regulatory consideration of reported data must be in standard conditions, as required by USEPA, all continuous PM_{10} data since 2013 is regulatory. On June 26, 2014, the Brawley monitor was impacted by elevated particulate matter caused by the entrainment of fugitive windblown dust from high winds generated by a trough of low-pressure that moved inland across California, including Imperial County.[2]

This report demonstrates that a naturally occurring event caused an exceedance observed on June 26, 2014, which elevated particulate matter and affected air quality. The report provides concentration to concentration monitoring site analyses supporting a clear causal relationship between the event and the monitored exceedance and provides an analysis supporting the not reasonably controllable or preventable (nRCP) criteria. Furthermore, the report provides information that the exceedance would not have occurred without the transport of fugitive windblown dust from outlying deserts and mountains within the Sonoran Desert. The document

[1] According to the National Institute of Standards and Technology (NIST) Time and Frequency Division the designation of the time of day for specific time zones are qualified by using the term “standard time” or “daylight time”. For year-round use, the designation can be left off inferring “local time” daylight or standard whichever is present. For 2014, Pacific Daylight Time (PDT) is March 9 through November 2. https://www.nist.gov/pml/time-and-frequency-division/local-time-faqs#intl

[2] Area Forecast Discussion National Weather Service San Diego CA 807 PM PST (907 PM PDT) Thursday, June 26, 2014.

further substantiates the request by the ICAPCD to exclude PM_{10} 24-hour NAAQS exceedance of 185 µg/m^3 (**Table 1-1**) as an exceptional event. This demonstration substantiates that this event meets the definition of the USEPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)[3].

I.1 Demonstration Contents

Section II - Describes the June 26, 2014 event as it occurred in California and into Imperial County, providing background information of the exceptional event and explaining how the event affected air quality. Overall, this section provides the evidence that the event was a natural event.

Section III – Using time-series graphs, summaries and historical concentration comparisons of the Brawley station this section discusses and establishes how June 26, 2014 event affected air quality demonstrating that a clear causal relationship exists between the event and the monitored exceedance. It is perhaps of some value to mention that the time-series graphs include PM_{10} data measured in both local conditions and standard conditions. Measured PM_{10} continuous data prior to 2013 is in local conditions, all other data is in standard conditions. The concentration difference between local and standard conditions has an insignificant impact on any data analysis. Overall, this section provides the evidence that human activity played little or no direct causal role in the June 26, 2014 event and its resulting emissions defining the event as a "natural event".[4]

Section IV - Provides evidence that the event of June 26, 2014 was not reasonably controllable or preventable despite the full enforcement and implementation of Best Available Control Measures (BACM).

Section V - Brings together the evidence presented within this report to show that the exceptional event affected air quality; that the event was not reasonably controllable or preventable; that there was a clear causal relationship between the event and the exceedance, and that the event was a natural event.

I.2 Requirements of the Exceptional Event Rule

The above sections combined comprise the technical requirements described under the Exceptional Events Rule (EER) under 40 CFR §50.14(c)(3)(iv). However, in order for the USEPA to concur with flagged air quality monitoring data, there are additional non-technical requirements.

[3] "Treatment of Data Influenced by Exceptional Events; Final Rule", 72 FR 13560, March 22, 2007

[4] Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.

I.2.a Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

The ICAPCD and the National Weather Service (NWS) provided notification via the ICAPCD's webpage that winds 15 to 25 mph and gust up to 35 miles per hour (mph) could affect this region potentially elevating particulate matter. Because of the potential for suspended particles and poor air quality, the ICAPCD issued a "No Burn" day in Imperial County. **Appendix A** contains copies of pertinent notices to the June 26, 2014 event.

I.2.b Initial Notification of Potential Exceptional Event (INPEE) (40 CFR §50.14(c)(2))

States are required under federal regulation to submit measured ambient air quality data into the AQS. AQS is the federal repository of Quality Assured and Quality Controlled (QA/QC) ambient air data used for regulatory purposes. When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. Notification occurs when an agency submits a request, which includes an initial event description, for flagging data in AQS.

On October 3, 2016, the US EPA promulgated revisions to the Exceptional Events rule, which included the requirement of an "Initial Notification of Potential Exceptional Event" (INPEE) process. This revised INPEE process requires communication between the US EPA regional office and the State, prior to the development of a demonstration. The intent of the INPEE process is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

The ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on the SLAMS measured concentrations from the Brawley monitor. The request, dated May 28, 2015 requested an initial flag for the measurement from the BAM 1020 in Brawley of 185 $\mu g/m^3$. Subsequently, after submittal of the request, CARB received corrected FEM data measurements in standard conditions, originally submitted in local conditions. USEPA requires data in standard conditions when making regulatory decisions. **Table 1-1** above provides the PM_{10} measured concentrations for all monitors in Imperial County for June 26, 2014. The difference in concentrations between local and standard has an insignificant impact on any data analysis. The submitted request included a brief description of the meteorological conditions for June 26, 2014 indicating that a potential natural event occurred.

I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v))

The ICAPCD posted, for a 30-day public review, a draft version of this demonstration on the ICAPCD webpage and published a notice of availability in the Imperial Valley Press on March 12, 2018. The published notice invited comments by the public regarding the request, by the ICAPCD, to exclude the measured concentrations of 185 $\mu g/m^3$, which occurred on June 26, 2014 in Brawley. The final closing date for comments was April 11, 2018. **Appendix A** contains a copy of the public notice affidavit along with any comments received by the ICAPCD for submittal as

part of the demonstration (40 CFR §50.14(c)(3)(v)).

I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(c)(3)(i))

States that have flagged data as a result of an exceptional event and who have requested an exclusion of said flagged data are required to submit a demonstration that justifies the data exclusion to the USEPA in accordance with the due date established by USEPA during the INPEE process (40 CFR §50.14(c)(2)). Currently, bi-weekly meetings between USEPA, CARB and Imperial County continue to discuss any potential documentation of events.

The ICAPCD, after the close of the comment period and after consideration of the comments will submit this demonstration along with all required elements, including received comments and responses to USEPA Region 9 in San Francisco, California. The submittal of the June 26, 2014 demonstration will have a regulatory impact upon the development and ultimate submittal of the PM_{10} State Implementation Plan for Imperial County in 2018.

I.2.e Necessary demonstration to justify an exclusion of data under (40 CFR§50.14(c)(3)(iv))

A This demonstration provides evidence that the event, as it occurred on June 26, 2014, satisfies the definition in 40 CFR §50.1(j) and (k) for an exceptional event.

- a The event created the meteorological conditions that entrained emissions and caused the exceedance.
- b The event clearly "affects air quality" such that there is the existence of a clear causal relationship between the event and the exceedance.
- c Analysis demonstrates that the event-influenced concentrations compared to concentrations at the same monitor at other times supports the clear causal relationship.
- d The event "is not reasonably controllable and not reasonably preventable."
- e The event is "caused by human activity that is unlikely to recur at a particular location or [is] a natural event."
- f The event is a "natural event" where human activity played little or no direct causal role.

B This demonstration provides evidence that the exceptional event affected air quality in Imperial County by demonstrating a clear causal relationship between the event and the measured concentrations in Brawley.

C This demonstration provides evidence of the measured concentrations to concentrations at the same monitor at other times supporting the clear causal relationship between the event and the affected monitor.

II June 26, 2014 Conceptual Model

This section provides a summary description of the meteorological and air quality conditions under which the June 26, 2014 event unfolded in Imperial County. The subsection elements include

- » A description and map of the geographic setting of the air quality and meteorological monitors
- » A description of Imperial County's climate
- » An overall description of meteorological and air quality conditions on the event day.

II.1 Geographic Setting and Monitor Locations

According to the United States Census Bureau, Imperial County has a total area of 4,482 square miles of which 4,177 square miles is land and 305 square miles is water. Much of Imperial County is below sea level and is part of the Colorado Desert an extension of the larger Sonoran Desert (**Figure 2-1)**. The Colorado Desert not only includes Imperial County but a portion of San Diego County.

FIGURE 2-1
COLORADO DESERT AREA IMPERIAL COUNTY

Fig 2-1: 1997 California Environmental Resources Evaluation System. According to the United States Geological Survey (USGS) Western Ecological Research Center, the Colorado Desert bioregion is part of the bigger Sonoran Desert Bioregion, which includes the Colorado Desert and Upper Sonoran Desert sections of California and Arizona, and a portion of the Chihuahuan Basin and Range Section in Arizona and New Mexico (Forest Service 1994)

A notable feature in Imperial County is the Salton Sea, which is at approximately 235 feet below sea level. The Chocolate Mountains are located east of the Salton Sea and extend in a northwest-southeast direction for approximately 60 miles (**Figure 2-2)**. In this region, the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect the northern-most extensions of the East Pacific rise. Consequently, the region is subject to earthquakes and the crust is being stretched, resulting in a sinking of the terrain over time.

FIGURE 2-2
SURROUNDING AREAS OF THE SALTON SEA

Fig 2-2: Image courtesy of the Image Science and Analysis Laboratory NASA Johnson Space Center, Houston Texas

All of the seven incorporated cities, including the unincorporated township of Niland, are surrounded by agricultural fields to the north, east, west and south (**Figure 2-6)**. Together, the incorporated cities, including Niland and the agricultural fields make what is known as the Imperial Valley. Surrounding the Imperial Valley are desert areas found on the eastern and western portions of Imperial County.

The desert area, found within the western portion of Imperial County is of note because of its border with San Diego County. From west to east, San Diego County stretches from the Pacific Ocean to its boundary with Imperial County. San Diego County has a varied topography. On its western side is 70 miles (110 km) of coastline. Most of San Diego between the coast and the Laguna Mountains consists of hills, mesas, and small canyons. Snow-capped (in winter)

mountains rise to the northeast, with the Sonoran Desert to the far east. Cleveland National Forest is spread across the central portion of the county, while the Anza-Borrego Desert State Park occupies most of the northeast. The southeastern portion of San Diego County is comprised of distinctive Peninsular mountain ranges. The mountains and deserts of San Diego comprise the eastern two-thirds of San Diego County and are primarily undeveloped back county with a native plant community known as chaparral. Of the nine major mountain ranges within San Diego County, the In-Ko-Pah Mountains and the Jacumba Mountains border Mexico and Imperial County.

Both mountain ranges provide the distinctive weathered dramatic piles of residual boulders that can be seen while driving Interstate 8 from Imperial County through Devil's Canyon and In-Ko-Pah Gorge. Interstate 8 runs along the US border with Mexico from San Diego's Mission Bay to just southeast of Casa Grande Arizona.

FIGURE 2-3
JACUMBA PEAK

Fig 2-3: The Jacumba Mountains reach an elevation of 4,512 feet (1,375 m) at Jacumba Peak, near the southern end of the chain. Source: Wikipedia at https://en.wikipedia.org/wiki/Jacumba Mountains

Northwest and northeast of the Jacumba Mountains is the Tierra Blanca Mountains, the Sawtooth Mountains and Anza-Borrego Desert State Park. Within the mountain ranges and the Anza-Borrego Desert State Park, there exists the Vallecito Mountains, the Carrizo Badlands, the Carrizo Impact Area, Coyote Mountains and the Volcanic Hills to name of few. Characteristically, these areas all have erosion that has occurred over time that extends from the Santa Rosa Mountains into northern Baja California in Mexico. For example, the Coyote Mountains consists of sand dunes left over from the ancient inland Sea of Cortez. Much of the terrain is still loose dirt, interspersed with sandstone and occasional quartz veins. The nearest community to the Coyote Mountain range is the community of Ocotillo. Of interest are the fossilized and hollowed out sand dunes that produce wind caves.

FIGURE 2-4
ANZA-BORREGO DESERT STATE PARK
CARRIZO BADLANDS

Fig 2-4: View southwest across the Carrizo Badlands from the Wind Caves in Anza-Borrego Desert State Park. Source: Wikipedia at https://en.wikipedia.org/wiki/Carrizo_Badlands

The Carrizo Badlands, which includes the Carrizo Impact Area used by the US Navy as an air-to-ground bombing range during World War II and the Korean War, lies within the Anza-Borrego Desert State Park. The Anza-Borrego Desert State Park is located within the Colorado Desert, is the largest state park in California occupying eastern San Diego County, reaching into Imperial and Riverside counties. The two communities within Anza-Borrego Desert State Park are Borrego Springs and Shelter Valley.

The Anza-Borrego Desert State Park lies in a unique geologic setting along the western margin of the Salton Trough. The area extends north from the Gulf of California to San Gorgonio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. The Anza-Borrego region changed gradually over time from intermittently being fed by the Colorado River Delta to dry lakes and erosion from the surrounding mountain ranges. The area located within the southeastern and northeastern section of San Diego County is a source of entrained fugitive dust emissions that affect Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increases in wind speeds.

Historical observations have indicated that the desert slopes and mountains of San Diego are a source of fugitive emissions along with those deserts located to the east and west of Imperial County, which extend into Mexico (Sonoran Desert, **Figure 2-7**). Combined, the desert areas and mountains of San Diego and the desert areas that extend into Mexico are sources of dust emissions, which affect the Imperial County during high wind events.

FIGURE 2-5
ANZA-BORREGO DESERT STATE PARK
DESERT VIEW FROM FONT'S POINT

Fig 2-5: Desert view from Font's Point. Source: Font's Point Anza-Borrego Photographed by and copyright of (c) David Corby; Wikipedia at https://en.wikipedia.org/wiki/Anza-Borrego_Desert_State_Park

FIGURE 2-6
LOCATION AND TOPOGRAPHY OF IMPERIAL COUNTY

Fig 2-6: Depicts the seven incorporated cities within Imperial Valley - City of Calipatria, City of Westmorland, City of Brawley, City of Imperial, City of El Centro, City of Holtville, and the City of Calexico. Niland is unincorporated. Mexicali, Mexico is to the south

FIGURE 2-7
DESERTS IN CALIFORNIA, YUMA AND MEXICO

Fig 2-7: Depicts the Sonoran Desert as it extends from Mexico into Imperial County. Source: Google Earth Terra Matrics

The air quality and meteorological monitoring stations used in this demonstration are shown in **Figure 2-8**. Of the five SLAMS within Imperial County, four stations measure both meteorological and air quality data. These SLAMS are located in Calexico, El Centro, Westmorland, and Niland; the station located in Brawley only measures air quality. Other air monitoring stations measuring air quality and meteorological data used for this demonstration include stations in eastern Riverside County, southeastern San Diego County and southwestern Arizona (Yuma County) (**Figure 2-8 and Table 2-1)**.

As mentioned above, the PM_{10} exceedance on June 26, 2014, occurred at the Brawley station. The Brawley, Niland and Westmorland stations are regarded as the "northern" monitoring sites within the Imperial County air monitoring network. In order to properly analyze the contributions from meteorological conditions occurring on June 26, 2014, other meteorological sites were used in this demonstration which include airports in eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), Imperial County, and other sites relevant to the wind event, such as within northern Mexico. (**Figure 2-8 and Appendix B)**.

FIGURE 2-8
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

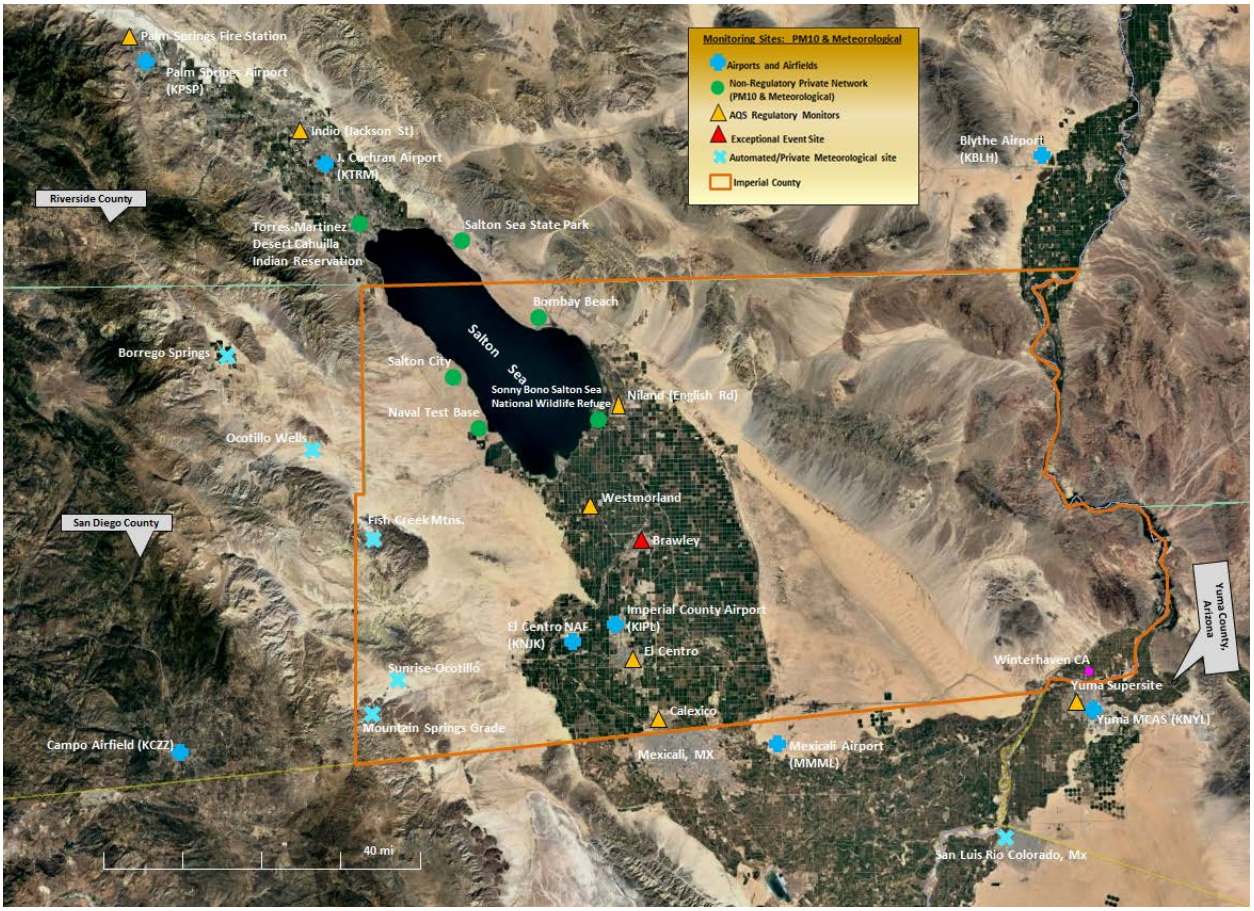


Fig 2-8: Depicts a select group of meteorological and PM_{10} monitoring sites in Imperial County, eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), and northern Mexico. The image provides the location of potential sites used to gather data in support of an Exceptional Event Demonstration. Source: Google Earth

In addition to meteorological sites, there are non-regulatory PM_{10} sites located around the Salton Sea that maybe referenced as an aid to help the reader understand the direction and velocity of winds that affect Imperial County. Unless, otherwise specifically indicated concentration references do not imply emissions from the surrounding playa of the Salton Sea. Three sites, in specific, are the Salton City air monitoring station, the Naval Test Base air monitoring station and the Sonny Bono air monitoring station. These privately owned stations are non-regulatory (**Figures 2-9 to 2-12**). The Salton City station is located 33.27275°N latitude and 115.90062˚W longitude, on the western edge of the Salton Sea (**Figure 2-9**). The station abuts a water reservoir along the Salton Sea with surrounding chaparral vegetation and unpaved open areas and roads. The Naval Test Base station is located 33.16923°N latitude and 115.85593˚W longitude, on the southwestern edge of the Salton Sea (**Figure 2-11**). The station sits on an abandoned US Military site, still owned by the Department of Defense. Unlike the Salton City station, light chaparral

vegetation and sandy open dune areas surround the Naval Test Base station. Directly to the west of the station is an orchard. The Sonny Bono station is located 33.17638°N latitude and 115.62310˚W longitude, on the southern portion of the Salton Sea within the Sonny Bono Salton Sea Wildlife Refuge. The Sonny Bono Salton Sea National Wildlife Refuge is 40 miles north of the Mexican border at the southern end of the Salton Sea within the Sonoran Desert. The Refuge has two separate managed units, 18 miles apart. Each unit contains wetland habitats, farm fields, and tree rows. The land of the Salton Sea Refuge is flat, except for Rock Hill, a small, inactive volcano, located near Refuge Headquarters. Bordering the Refuge is the Salton Sea on the north and farmlands on the east, south, and west.

FIGURE 2-9
SALTON CITY AIR MONITORING STATION

Fig 2-9: Depicts the Salton City air monitoring (circled) site operated by a private entity. View site photos at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-10
SALTON CITY AIR MONITORING STATION
WEST

Fig 2-10: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site no=13604&date=17

FIGURE 2-11
NAVAL TEST BASE AIR MONITORING STATION

Fig 2-11: Depicts the Naval Test Base air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site no=13603&date=17

FIGURE 2-12
NAVAL TEST BASE AIR MONITORING STATION WEST

Fig 2-12: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site no=13604&date=17

FIGURE 2-13
SONNY BONO AIR MONITORING STATION

Fig 2-13: Depicts the Sonny Bono air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?siteno=13604&date=17

FIGURE 2-14
SONNY BONO SALTON SEA NATIONAL WILDLIFE REFUGE

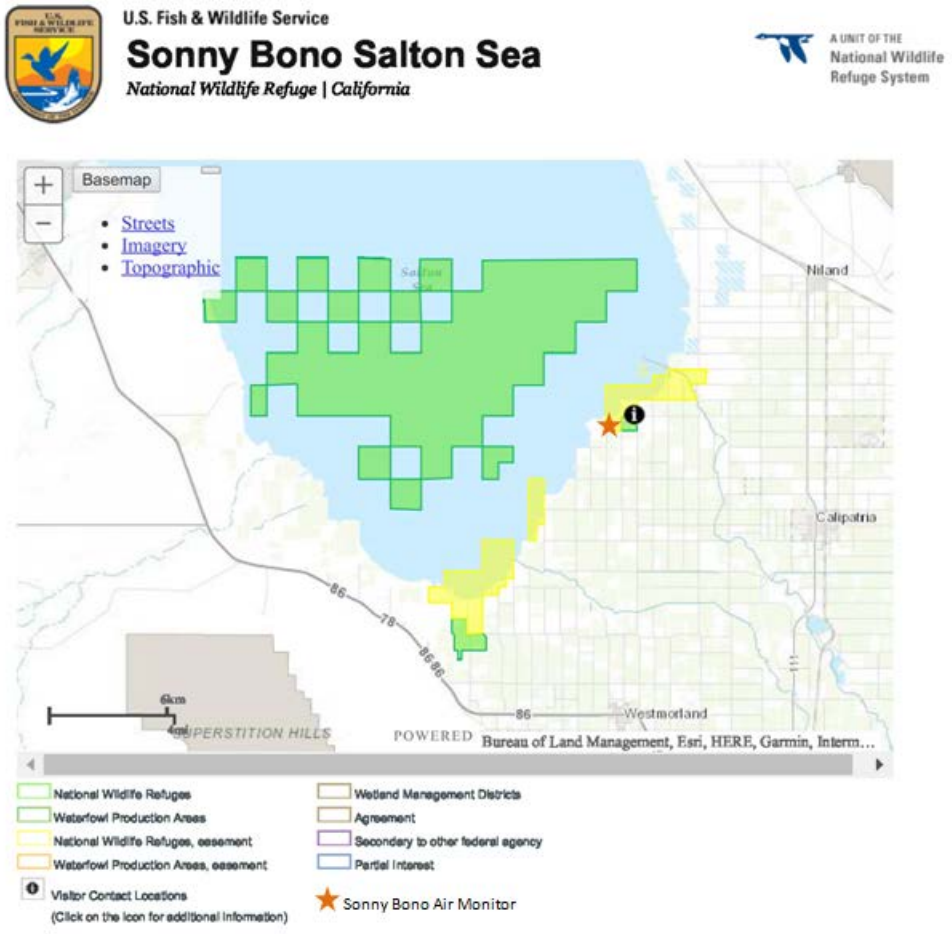


Fig 2-14: The Sonny Bono Wildlife Refuge has about 2,000 acres that are farmed and managed for wetlands. In 1998, the Refuge was renamed after Congressman Sonny Bono, who helped inform the U.S. Congress of the environmental issues facing the Salton Sea as well as acquiring funding for this Refuge to help it respond to avian disease outbreaks and other habitat challenges at the Salton Sea. Source: https://www.fws.gov/refuge/SonnyBonoSaltonSea/about.html

TABLE 2-1
MONITORING SITES IN IMPERIAL COUNTY, RIVERSIDE COUNTY AND ARIZONA
JUNE 26, 2014

Monitor Site Name	*Operator	Monitor Type	AQS ID	AQS PARAMETER CODE	ARB Site Number	Elevation (meters)	24-hr PM_{10} (ug/m^3) Avg	1-hr PM_{10} (ug/m^3) Max	**Time of Max Reading	Max Wind Speed (mph)	**Time of Max Wind Speed
IMPERIAL COUNTY											
Brawley-Main Street #2	ICAPCD	Hi-Vol Gravimetric	06-025-0007	(81102)	13701	-15	-	-	-	-	-
		BAM 1020					185.9	741.3	1600		
Calexico-Ethel Street	CARB	Hi-Vol Gravimetric	06-025-0005	(81102)	13698	3	-	-	-	15.5	1900
El Centro-9th Street	ICAPCD	Hi-Vol Gravimetric	06-025-1003	(81102)	13694	9	-	-	-	12.4	2200
Niland-English Road	ICAPCD	Hi-Vol Gravimetric	06-025-4004	(81102)	13997	-57	-	-	-	25	2100
		BAM 1020					130.5	450	2100		
Westmorland	ICAPCD	Hi-Vol Gravimetric	06-025-4003	(81102)	13697	-43	-	-	-	-	-
RIVERSIDE COUNTY											
Palm Springs Fire Station	SCAQMD	TEOM	06-065-5001	(81102)	33137	174	66	337	1500	-	-
Indio (Jackson St.)	SCAQMD	TEOM	06-065-2002	(81102)	33157	1	61.8	152	1800	-	-
ARIZONA – YUMA											
Yuma Supersite	ADEQ	TEOM	04-027-8011	(81102)	N/A	60	84.8	299	2100	-	-

*CARB = California Air Resources Board
*ICAPCD = Air Pollution Control District, Imperial County
*SCAQMD = South Coast Air Management Quality District
*ADEQ =Arizona Department of Environmental Quality

**Time represents the actual time/hour of the measurement in question according to the zone time (PST unless otherwise noted)

II.2 Climate

As mentioned above, Imperial County is part of the Colorado Desert, which is a subdivision of the larger Sonoran Desert (**Figure 2-15**) encompassing approximately 7 million acres (28,000 km^2). The desert area encompasses Imperial County and includes parts of San Diego County, Riverside County, and a small part of San Bernardino County.

FIGURE 2-15
SONORAN DESERT REGION

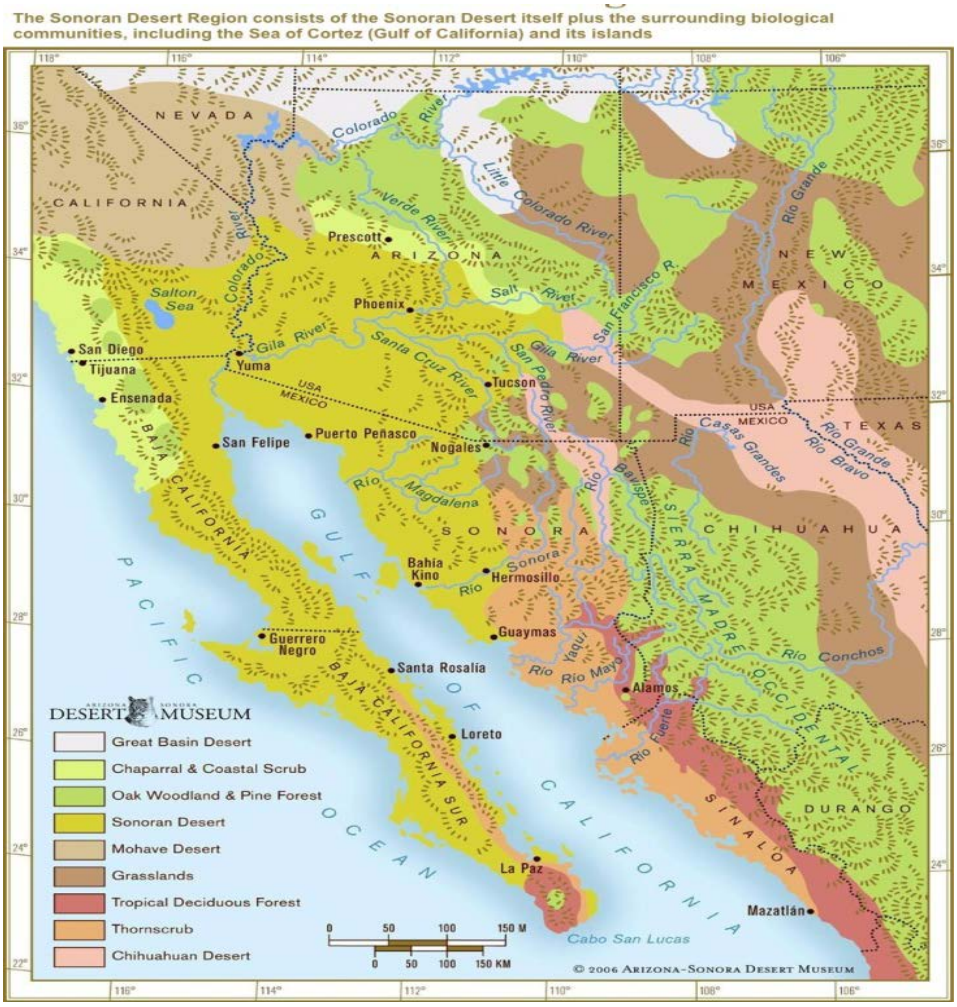


Fig 2-15: Depicts the magnitude of the region known as the Sonoran Desert. Source: Arizona-Sonora Desert Museum at http://desertmuseum.org/center/map.php

The majority of the Colorado Desert lies at a relatively low elevation, below 1,000 feet (300 m), with the lowest point of the desert floor at 275 feet (84 m) below sea level at the Salton Sea. Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet (3,000 m), most of the region's mountains do not exceed 3,000 feet (910 m).

In the Colorado Desert (Imperial County), the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect to the northern-most extensions of the East Pacific Rise. Consequently, the region is subject to earthquakes, and the crust is being stretched, resulting in a sinking of the terrain over time.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert experiences two rainy seasons per year (in the winter and late summer), especially toward the southern portion of the region which includes a portion of San Diego County. The Colorado Desert portion of San Diego County receives the least amount of precipitation. Borrego Springs, the largest population center within the San Diego desert region averages 5 inches of rain with a high evaporation rate. By contrast, the more northerly Mojave Desert usually has only winter rains.

The west coast Peninsular Ranges, or other west ranges, of Southern California–northern Baja California, block most eastern Pacific coastal air and rains, producing an arid climate. Other short or longer-term weather events can move in from the Gulf of California to the south, and are often active in the summer monsoons. These include remnants of Pacific hurricanes, storms from the southern tropical jet stream, and the northern Inter Tropical Convergence Zone (ITCZ).

The arid nature of the region is demonstrated when historic annual average precipitation levels in Imperial County average 3.11" (**Figure 2-16**). During the 12-month period prior to June 26, 2014, Imperial County measured total annual precipitation of 2.12 inches. Such arid conditions, as those preceding the event, result in soils that are particularly susceptible to particulate suspension by the elevated gusty winds.

FIGURE 2-16
IMPERIAL COUNTY HISTORICAL WEATHER

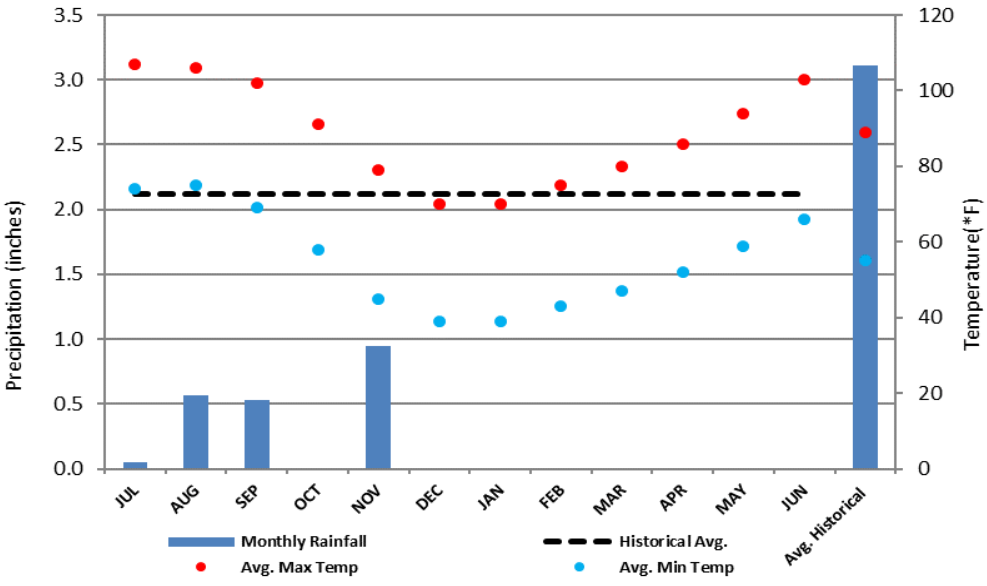


Fig 2-16: In the months prior to June 26, 2014, the region suffered abnormally low total precipitation of 2.12 inches. Average annual precipitation is 3.11 inches. Meteorological data courtesy of Weather Underground, California Observed Climate Normals, and Western Regional Climate Center (WRCC) http://www.wrcc.dri.edu/cgi-bin/climain.pl?ca2713

The NWS explains that the speed of any wind resulting from a weather system is directly proportional to the change in air pressure, called a pressure gradient, such that when the pressure gradient increases so does the speed of the wind.[5] Because the pressure gradient is just the difference in pressure between high and low pressure areas, changes in weather patterns may recur seasonally.

Typically, high pressure brings clear skies and with no clouds, there is more incoming shortwave solar radiation causing temperatures to rise. When surface winds become light, the cooling of the air produced directly under a high-pressure system can lead to a buildup of particulates in urban areas under an elongated region of relatively high atmospheric pressure or ridge causing widespread haze. Conversely, a trough is an elongated region of relatively low atmospheric pressure often associated with fronts. Troughs may be at the surface, or aloft under various conditions. Most troughs bring clouds, showers, and a wind shift, particularly following the passage of the trough.

While windblown dust events in Imperial County during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California. These winds are the result of strong surface pressure gradients between the approaching low-pressure system, accompanying cold front, and higher pressure ahead of it. As the low-pressure system and cold front approaches and passes, gusty southwesterly winds typically shift to northwesterly causing variable west winds. These strong winds suspend dust into the atmosphere and transport windblown dust over long distances, especially if soils in the region are dry.

II.3 Event Day Summary

The exceptional event for June 26, 2014, caused by a trough of low-pressure that moved into the Pacific Northwest and travelled across California and the Great Basin affected air monitors in Imperial County. As the trough traveled, east throughout the day a deepening of the marine layer to the west and an increase of onshore pressure gradients caused strong and gusty westerly winds across the mountains and deserts of southeast California.[6]

On June 26, 2014, a low-pressure trough moved through California causing strong and gusty westerly winds to blow through the mountain passes and into the desert and agricultural lands in Imperial County affecting air quality and causing an exceedance at the Brawley monitor.

[5] NWS JetStream – Origin of Wind http://www.srh.noaa.gov/jetstream/synoptic/wind.html and https://www.weather.gov/jetstream/

[6] Area Forecast Discussion National Weather Service San Diego CA 245 AM PST (345 AM PDT); 830 AM PST (930 AM PDT); 745 PM PST (845 PM PDT), Wednesday, June 25, 2014. Area Forecast Discussion National Weather Service San Diego CA 250 AM PST (350 AM PDT); 800 AM PST (900 AM PDT); 807 PM PST (907 PM PDT) Thursday, June 26, 2014.

Figures 2-17 and 2-18 provide information regarding the expected movement of the trough and the associated increase in pressure gradients, which led to high winds across southeastern California.

FIGURE 2-17
GOES-W VISIBLE AND NFRARED SATELLITE IMAGES JUNE 26, 2014

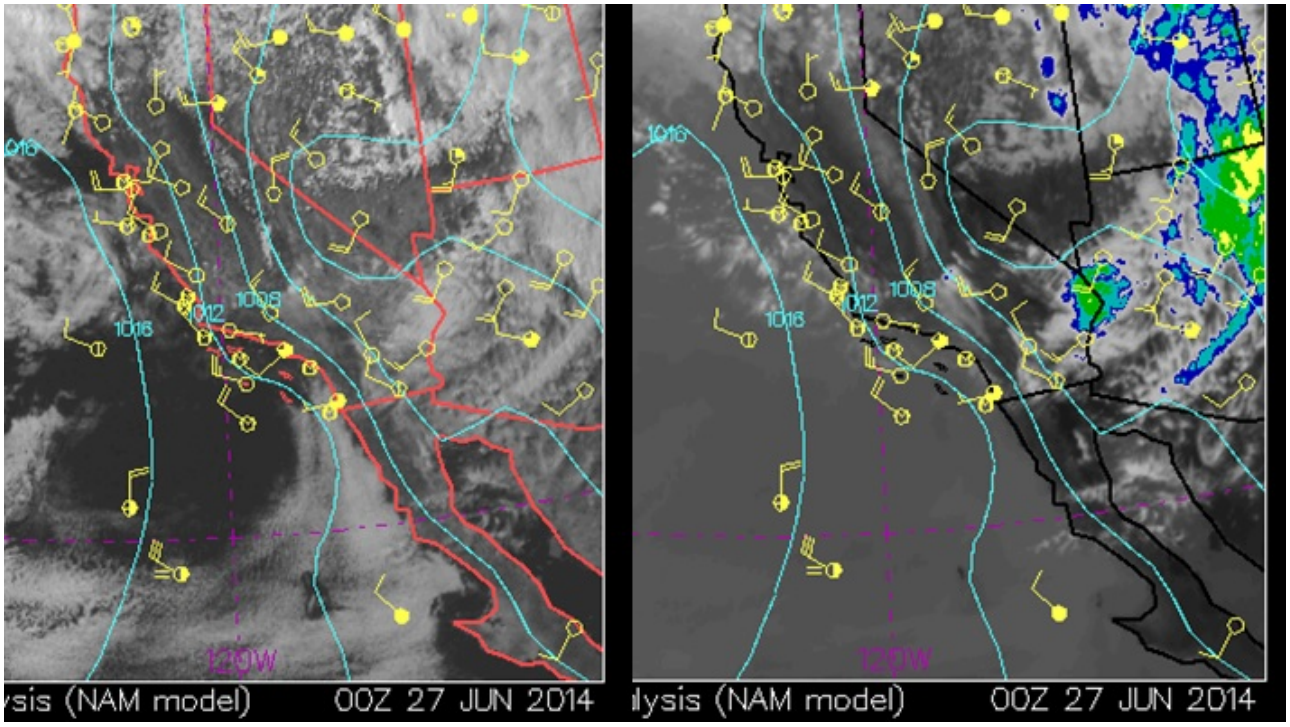


Fig 2-17: A pair of GOES-W visible (left) and infrared (right) satellite images on June 26, 2014 at 1600 PST shows a moderate tightening of the pressure gradient over the region. Wind barbs indicate southwesterly winds over southeastern California. Courtesy of SFSU Department of Earth and Climate Sciences and the California Regional Weather Server

FIGURE 2-18
DAILY WEATHER MAP ON JUNE 26, 2014

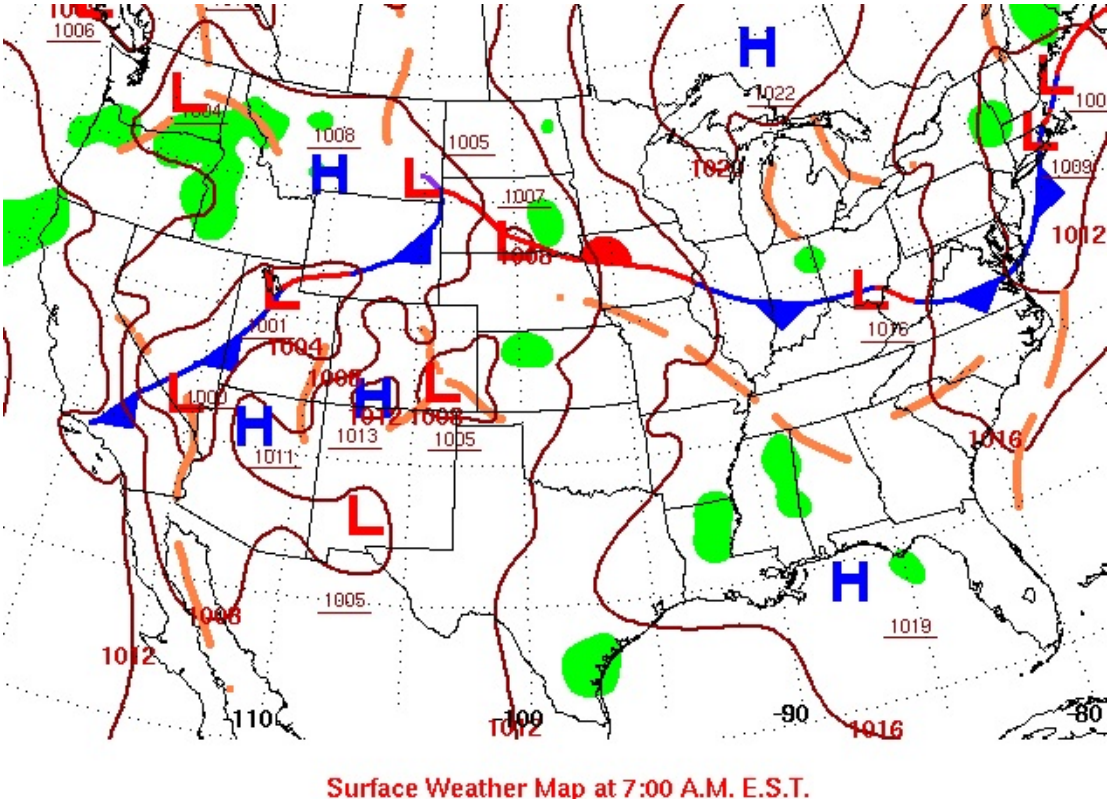


Fig 2-18: A daily weather map for June 26, 2014 shows a surface trough (dashed line) extending from southern Nevada southward near the California-Arizona border and into northern Mexico. This brought unsettled weather to the region. Courtesy of Weather Prediction Center

The San Diego NWS office area forecast issued June 24, 2016 (Tuesday) described the transition of a weak ridging aloft expected on June 25, 2014 to a trough pattern as a fairly strong shortwave on Thursday June 26, 2014. The area forecast described a jet stream dipping southward and moving across south-central California Thursday evening (June 26, 2014). By June 25, 2014, the San Diego NWS office explained in its area forecast that the trough was expected to move inland across northern California however the deepening of the marine was expected Thursday night (June 26, 2014) and Friday, June 27, 2014. The area forecast further explained that with the movement of the trough inland the onshore flow would increase pressure gradients/height gradients causing gusty west winds in the mountains and deserts.

While the Phoenix NWS office did not issue an Urgent Weather message, the San Diego NWS office issued six Urgent Weather messages containing wind advisories for mountain ridges through passes and canyons along mountain desert slopes and into adjacent desert areas. The advisories identified areas through and east of the San Gorgonio Pass, north of Interstate 10 in the Coachella Valley, areas along Interstate 8 in southeastern San Diego County and travel impacts included Highway 111 in the Coachella Valley. The first issued wind advisory was at

1237pm PST on June 25, 2014 while the last issued wind advisory, with an expiration of 0200am, was at 0150am June 27, 2014.

The wind advisories forecast gusty west winds 20 to 35 mph potentially affecting visibility due to blowing dust and sand in the deserts. **Figure 2-19** is a graphical illustration of the chain of events for June 26, 2014.

FIGURE 2-19
RAMP-UP ANALYSIS JUNE 26, 2014

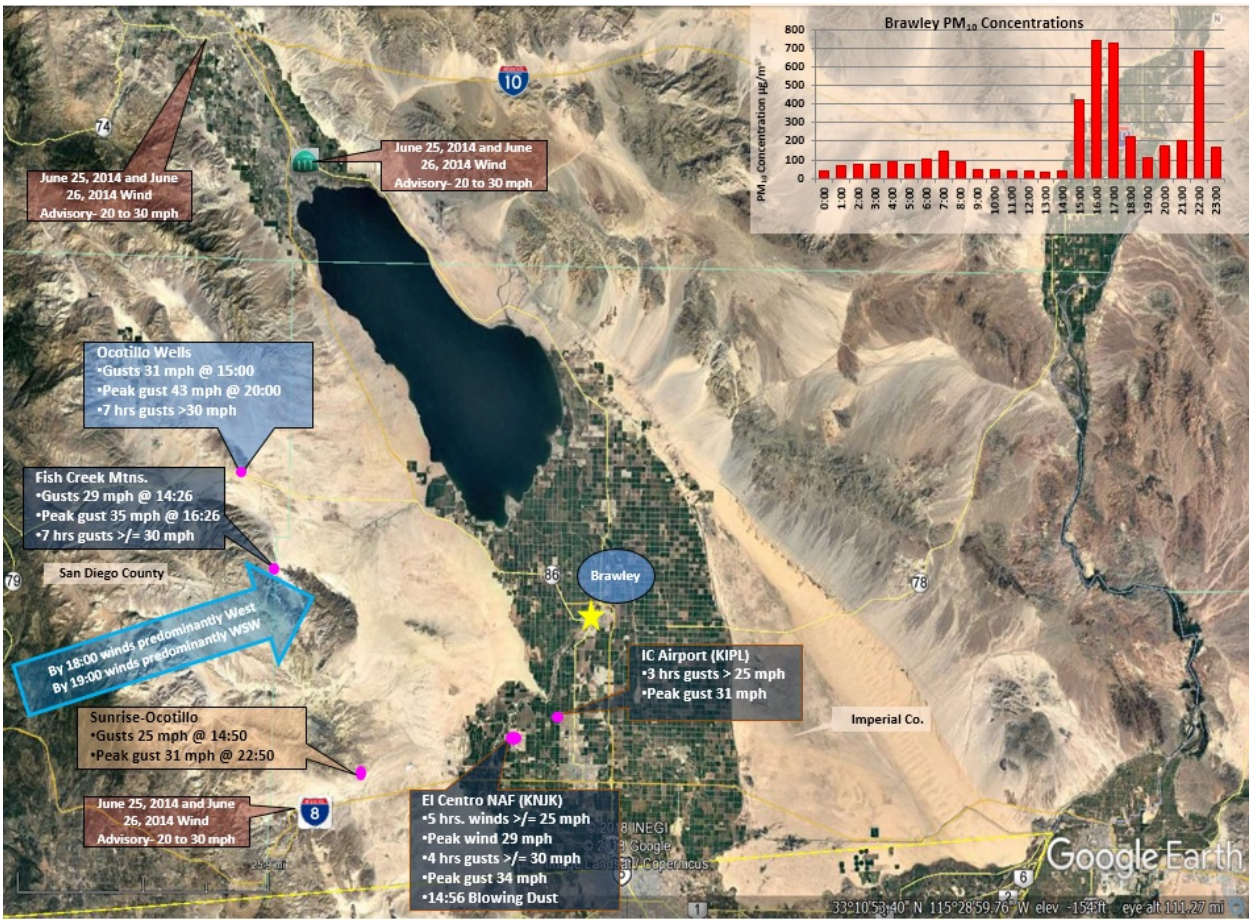


Fig 2-19: A ramp-up in wind speed was preceded by a shift to first a WNW direction, then a WSW direction. Both KNJK and KIPL measured gusts over 30 mph. Wind data from NCEI's QCLCD system. Air quality data from the EPA's AQS data bank. Google Earth base map

Table 2-2 contains a summary of maximum winds, peak wind gusts, and wind direction at monitors in Imperial County, eastern Riverside County, Yuma County, Arizona, and Mexicali. For detailed meteorological station, graphs see **Appendix B**.

TABLE 2-2
WIND SPEEDS ON JUNE 26, 2014

Station Monitor Airport Meteorological Data	Maximum Wind Speed (WS) (mph)	Wind Direction during Max WS (degrees)	*Time of Max Wind Speed	24 hr Maximum Wind Gust (WG) (mph)	Time of Max WG	PM_{10} correlated to time of Max Wind Speed Brly	Nlnd
IMPERIAL COUNTY							
Imperial Airport (KIPL)	22	260	2253	31	2353	683	167
Naval Air Facility (KNJK)	29	250	2156	34	2156	203.7	450
Calexico (Ethel St)	15.5	275	1900	-	-	112.9	353.0
El Centro (9th Street)	12.4	270	2200	-	-	683	248
Niland (English Rd)	25	252	2100	-	-	203.7	450
RIVERSIDE COUNTY							
Blythe Airport (KBLH)	27.6	230	1752	34	1952	725.7	112.3
Palm Springs Airport (KPSP)	29.9	320	1853	54	1753	223.5	294
Jacqueline Cochran Regional Airport (KTRM) - Thermal	16	340	2152	-	-	203.7	449.8
ARIZONA - YUMA							
Yuma MCAS (KNYL)	21.9	290	2257	28.8	2257	683	247.8
MEXICALI - MEXICO							
Mexicali Int. Airport (MXL)	23	280	1841	-	-	223.5	294

*All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted

National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory HYSPLIT back trajectory models,[7] **Figures 2-20 through 2-22**, indicate the path of airflow which is consistent with measured wind direction at the Imperial County Airport (KIPL), in the hours leading up to the 1300 PST, 1500 PST and 2100 PST. The identified hours help demonstrate the airflow prior to and during the shift in wind direction and increases in wind speeds and gusts. The 1500 PST hour is coincident with the measurement of consecutive elevated concentrations at the Brawley monitor.

Shortly before the shift in airflow (**Figure 2-20**), winds remained moderately low, as did concentrations at the Brawley and Niland monitors. According to KIPL winds varied during the morning hours from the north, south-south east, and east southeast however at approximately 1000 PST winds had a general south, southwest direction. Moderately low wind speeds, during the morning hours remained at the surface level allowing for the transport of dust particles at lower levels. However, by 0300pm (**Figure 2-21**) winds as measured at KIP shift to a predominantly west direction along with increases in wind speeds, gusts and concentrations. The dust particles now suspended by elevated winds speeds into the atmosphere affect the Brawley monitor. By 0900pm (**Figure 2-22**), elevated wind speeds and gusts persist into the following morning, Friday June 27, 2014 elevating concentrations at both the Niland and Brawley monitors. Measured winds speeds at both local airports ranged between 14 mph and 29 mph with the El

[7] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

Centro NAF (KNJK) measuring the highest wind speeds and gusts while the Imperial County airport (KIPL) measured more hours of gusts.

Of note, modeled winds differ from local conditions. Data used in the HYSPLIT model has a horizontal resolution of 12 km and integrated every three hours. Thus, the HYSPLIT model may differ from local observed surface wind speeds and directions.

FIGURE 2-20
NOAA HYSPLIT MODEL 0100 PM JUNE 26, 2014

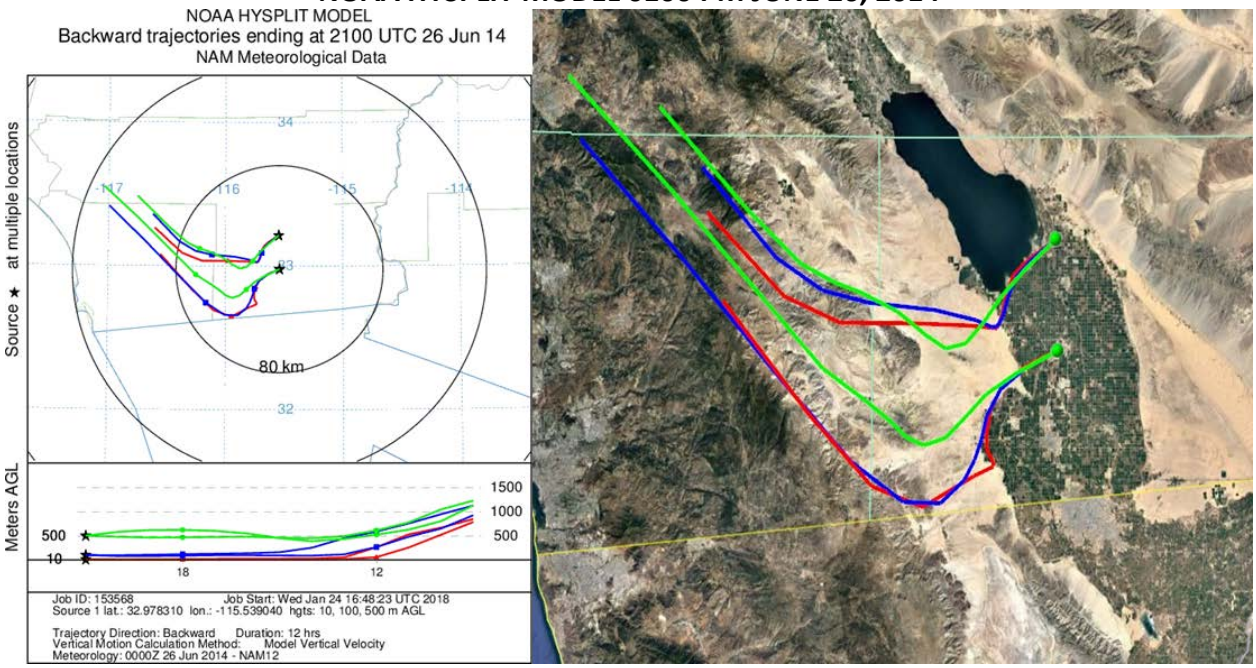


Fig 2-20: A 12-hour back-trajectory ending at Brawley at 0100pm PST on June 26, 2014. Prior to the increase in hourly concentrations at the Brawley monitor, airflow had a generally south direction and wind remained moderately low. Airflow at the Brawley monitor at the 10 m level (red line) showed little elevation gain, allowing for the entrainment of dust. Red line indicates airflow at 10 meters AGL (above ground level); blue=100 meters AGL; green=500 meters AGL. Generated through NOAA's Air Resources Laboratory HYSPLIT

FIGURE 2-21
NOAA HYSPLIT MODEL 0300 PM JUNE 26, 2014

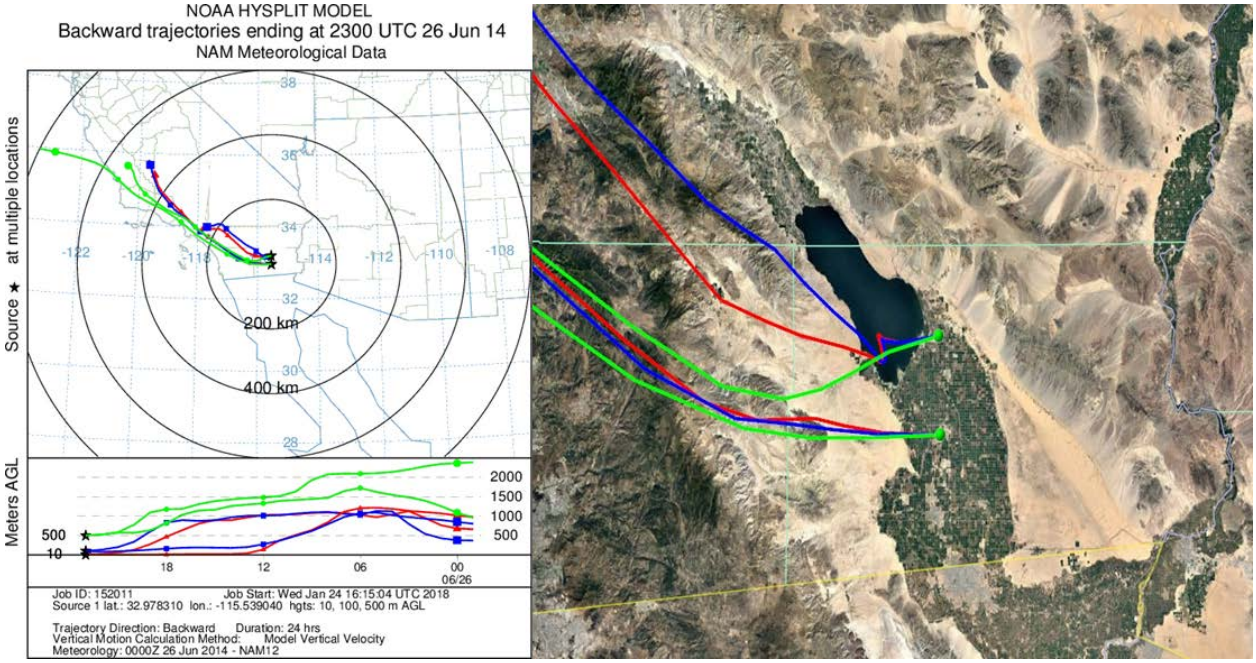


Fig 2-21: A 12-hour back-trajectory ending at Brawley at 0300pm PST on June 26, 2014 coincident with the first continuous elevated hourly concentration at the Brawley monitor. The Brawley monitor measured two hours of concentrations above 100 µg/m^3 coincident with slightly elevated wind speeds at KIPL. Prior to the increase in hourly concentrations at the Brawley monitor, air at the 10 m level (red line) showed little elevation gain, allowing for the entrainment of dust. Red line indicates airflow at 10 meters AGL (above ground level); blue=100 meters AGL; green=500 meters AGL. Generated through NOAA's Air Resources Laboratory HYSPLIT

FIGURE 2-22
NOAA HYSPLIT MODEL 0900 PM JUNE 26, 2014

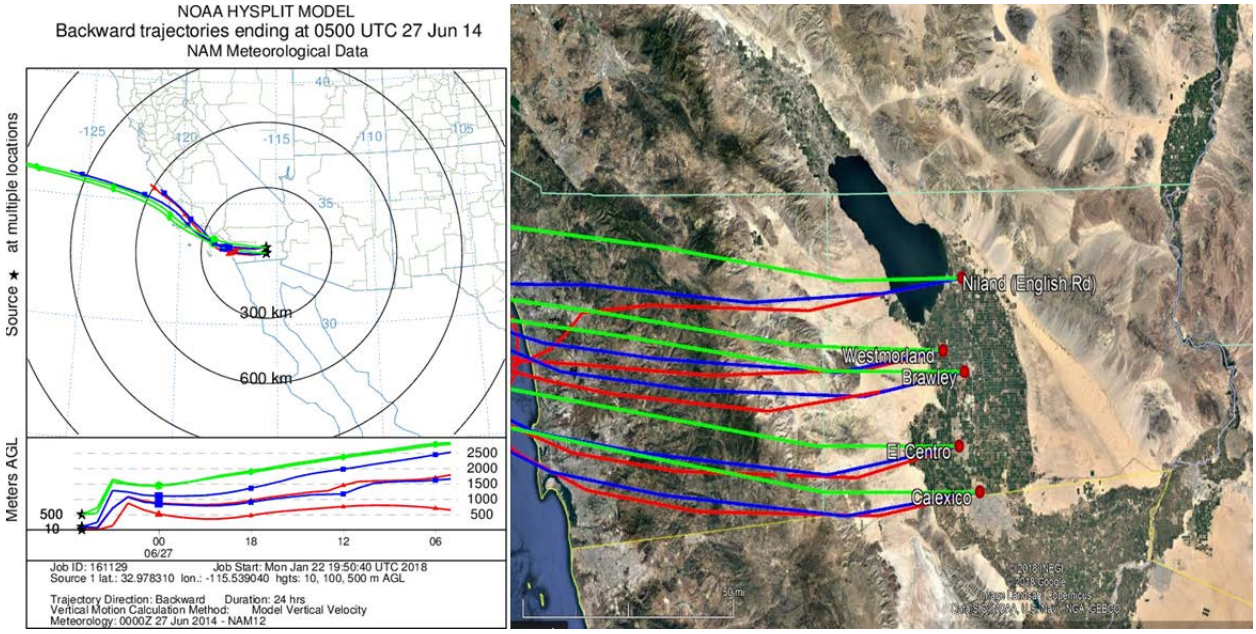


Fig 2-22: A 24-hour back-trajectory ending at Brawley at 0900pm PST on June 26, 2014. Along with increased wind speeds and gusts dust particles travel from the mountains and desert slopes located west of Imperial County, into and over desert open areas and agricultural lands in Imperial County. Red line indicates airflow at 10 meters AGL (above ground level); blue=100 meters AGL; green=500 meters AGL. Generated through NOAA's Air Resources Laboratory HYSPLIT

Figure 2-23 illustrates the elevated levels of PM_{10} concentrations measured in Riverside, Imperial, and Yuma counties. The entrained windblown dust particles resulted in a 24-hr average concentration of 185 µg/m^3 at the Brawley monitor.

The resulting entrained dust and accompanying high winds from the system qualify this event as a "high wind dust event".[8] High wind dust events are considered natural events where the windblown dust is either from solely a natural source or from areas where anthropogenic sources of windblown dust are controlled with Best Available Control Measures (BACM). The following sections provide evidence that the June 26, 2014 high, wind event qualifies as a natural event and that BACM was overwhelmed by the suddenness and intensity of the meteorological event.

[8] Title 40 Code of Federal Regulations part 50: §50. 1(p) High wind dust event is an event that includes the high-speed wind and the dust that the wind entrains and transports to a monitoring site.

FIGURE 2-23
72 HOUR PM_{10} CONCENTRATIONS REGIONAL SITES

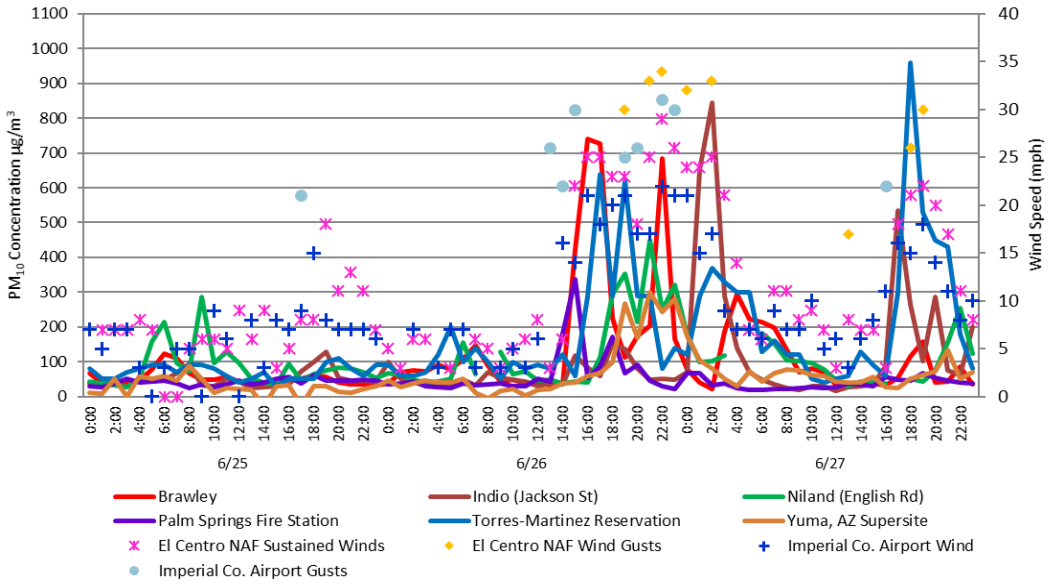


Fig 2-23: Is the graphical representation of the 72-hour relative PM_{10} concentrations at various monitoring locations throughout Riverside, Imperial and Yuma counties. The graph clearly demonstrates the elevation of PM_{10} concentration on June 26, 2014 at all sites affected by the weather system and accompanying winds

III Historical Concentrations

III.1 Analysis

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area. The following time series plots illustrate that PM_{10} concentrations measured at the Brawley monitor on June 26, 2014, compared to non-event and event days demonstrates the variability over several years and seasons. The analysis also provides supporting evidence that there exists a clear causal relationship between the June 26, 2014 high wind event and the exceedance measured at the Brawley monitor.

Figures 3-1 and 3-2 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Brawley monitor for the period of January 1, 2010 through June 30, 2014. Note that prior to 2013, BAM data was not FEM therefore, not reported into AQS.[9] Properly establishing the variability of the event as it occurred on June 26, 2014, 24-hour averaged PM_{10} concentrations between January 1, 2010 and June 30, 2014 were compiled and plotted as a time series. All figures illustrate that the exceedance, which occurred on June 26, 2014, were outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs obtained through the EPA's AQS data bank.

[9] Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM_{10} concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m3) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP, 760 torr and 25 C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM_{10} concentrations to PM_{10} concentrations with in this demonstration.

FIGURE 3-1
BRAWLEY HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO JUNE 26, 2014

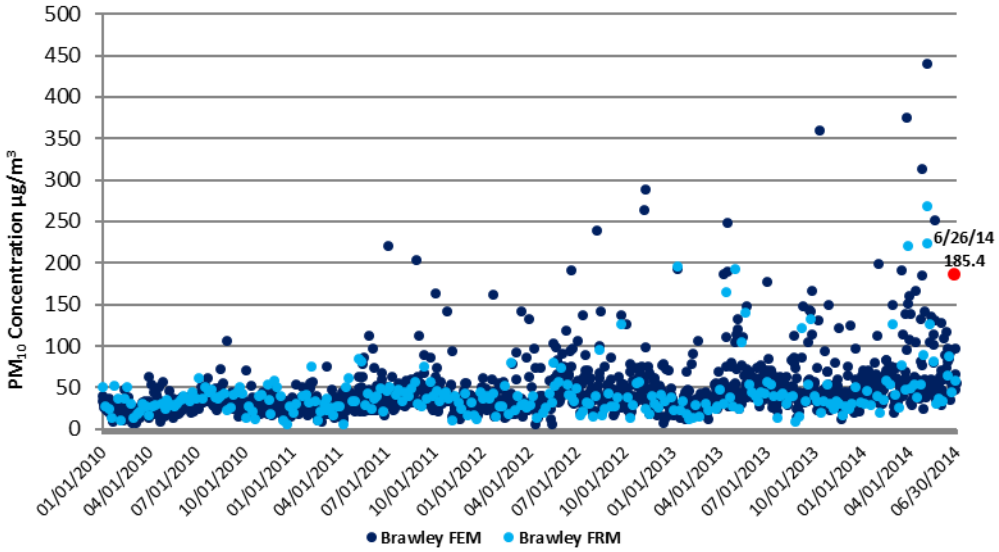
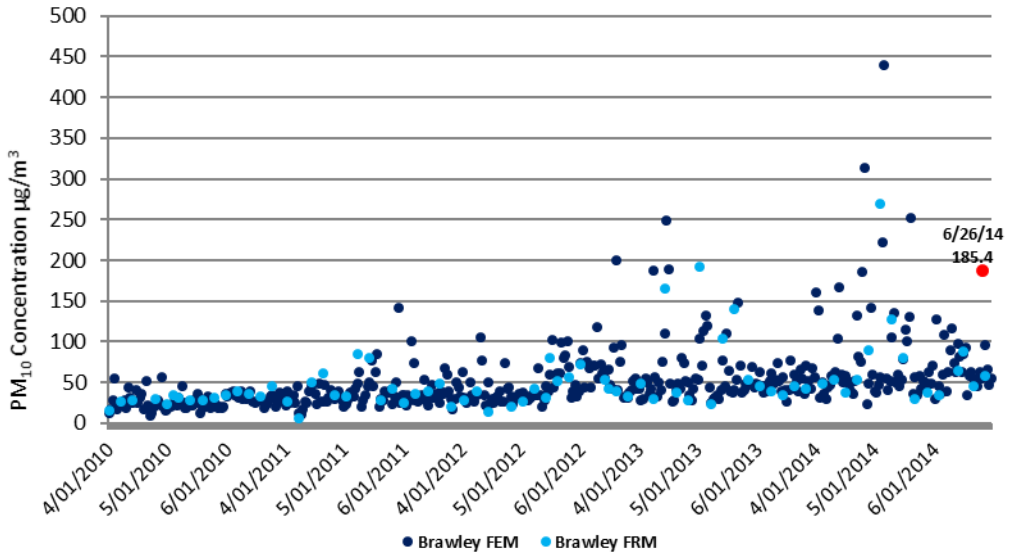


Fig 3-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 185 µg/m^3 on June 26, 2014 by the Brawley monitor was outside the normal historical concentrations when compared to similar event days and non-event days. Of the 1,638 sampling days there were 28 exceedance days which is less than a 2.0% occurrence rate

The time series, **Figure 3-1** for Brawley included 2,903 credible samples measured between January 1, 2010 and June 26, 2014, or 1,638 sampling days.

Overall, the time series illustrates that the Brawley monitor, measured 28 exceedance days out of the 1,638 sampling days, which is less than a 2.0% occurrence rate. Of the 28 measured exceedance days, 13 exceedance days occurred during the second quarter (April – June). The remaining 15 exceedance days occurred during the first, third and fourth quarters. The June 26, 2014 concentration is outside the normal historical measurements for the second quarter. No exceedances of the standard occurred during 2010. As mentioned above, FEM BAM data was not regulatory from 2010 to 2012.

FIGURE 3-2
BRAWLEY SEASONAL COMPARISON
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
***APRIL 1, 2010 TO JUNE 26, 2014**



***Quarterly; April 1, 2010 to June 30, 2013 and April 1, 2014 to June 26, 2014**

Fig 3-2: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 185 µg/m^3 by the Brawley monitor on June 26, 2014 was outside the normal seasonal concentrations when compared to similar days and non-event days

Figure 3-2 displays the seasonal fluctuation over 451 sampling days at the Brawley monitor for second quarter (April to June) between 2010 and 2014. The Brawley monitor measured 525 credible samples over 451 sampling days. Of the 451 sampling days, there were 13 measured exceedance days, which equates to less than a 3.0% occurrence rate. The June 26, 2014 measured concentration at the Brawley monitor was outside the normal historical and seasonal concentrations when compared to both event days and non-event days.

FIGURE 3-3
BRAWLEY HISTORICAL
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO JUNE 26, 2014

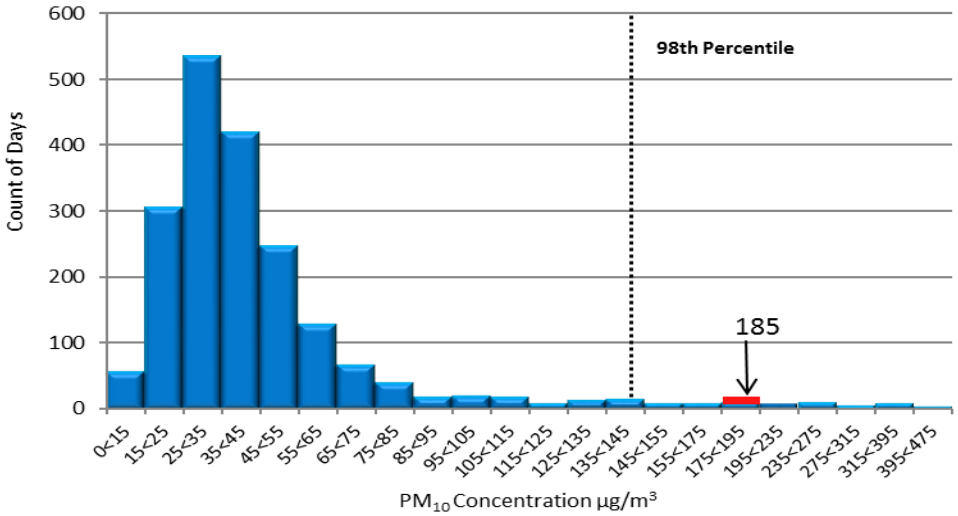
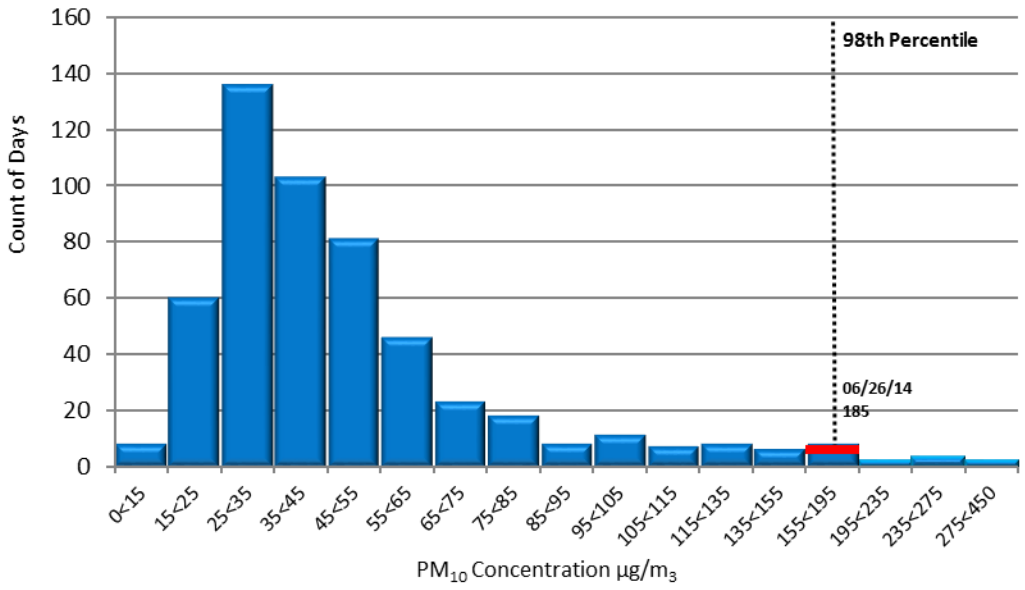


Fig 3-3: The 24-hr average PM_{10} concentrations measured at the Brawley monitor demonstrates that the June 26, 2014 event was in excess of the 98th percentile

FIGURE 3-4
BRAWLEY SEASONAL
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
***APRIL 1, 2010 TO JUNE 26, 2014**



***Quarterly; April 1, 2010 to June 30, 2013 and April 1, 2014 to June 26, 2014**

Fig 3-4: The 24-hr average PM_{10} concentration at the Brawley monitor demonstrates that the June 26, 2014 event was in excess of the 98th percentile

For the combined FRM and FEM data sets for the Brawley monitor the annual historical and the seasonal historical PM_{10} concentration of 185 µg/m^3 both are above the 98th percentile rank. Looking at the annual time series concentrations, the seasonal time series concentrations and the percentile rankings for both the historical and seasonal patterns the June 26, 2014 measured exceedance is clearly outside the normal concentration levels when comparing to non-event days and event days.

III.2 Summary

The information provided, above, by the time series plots, seasonal time series plots, and the percentile rankings illustrate that the PM_{10} concentration observed on June 26, 2014 occurred infrequently. When comparing the measured PM_{10} level on June 26, 2014 and following USEPA EER guidance, this demonstration provides supporting evidence that the measured exceedance measured at the Brawley monitor was outside the normal historical and seasonal historical concentration levels.

The historical concentration analysis provided here supports the determination that the June 26, 2014 natural event affected the concentration levels at the Brawley monitor causing an exceedance. The concentration analysis further supports that the natural event affected air quality in such a way that there exists a clear causal relationship between the measured exceedance on June 26, 2014 and the natural event, qualifying the natural event as an Exceptional Event.

IV Not Reasonably Controllable or Preventable

According to the October 3, 2016 promulgated revision to the Exceptional Event (EE) rule under 40 CFR §50.14(b)(8) air agencies must address the "not reasonably controllable or preventable" (nRCP) criterion as two prongs. To address the nRCP criterion the ICAPCD must not only identify the natural and anthropogenic sources of emissions causing and contributing to the monitored exceedance but must identify the relevant State Implementation Plan (SIP) measures and/or other enforceable control measures in place for the identified sources. An effective analysis of the nRCP must include the implementation status of the control measures to consider the measures as enforceable. USEPA considers control measures enforceable if approved into the SIP within 5 years of an EE demonstration submittal. The identified control measures must address those specific sources that as causing or contributing to a monitored exceedance.

The final EE rule revision explains that an event is not reasonably controllable if reasonable measures to control the impact of the event on air quality were applied at the time of the event. Similarly, an event is not reasonably preventable if reasonable measures to prevent the event were applied at the time of the event. However, for "high wind events" when PM_{10} concentrations are due to dust raised by high winds from desert areas whose sources are controlled with Best Available Control Measures (BACM) then the event is a "natural event" where human activity plays little or no direct causal role and thus is considered not preventable.

This section begins by providing background information on all SIP and other enforceable control measures in force during the EE for June 26, 2014. In addition, this June 26, 2014 demonstration provides technical and non-technical evidence that gusty westerly winds blew across the mountains and deserts within southeastern California and into Imperial County suspending particulate matter affecting the Brawley monitor on June 26, 2014. This section identifies all natural and anthropogenic sources and provides regulatory evidence of the enforceability of the control measures in place during the June 26, 2014 EE.

IV.1 Background

Inhalable particulate matter (PM_{10}) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM_{10} NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM_{10} from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM_{10}. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

On September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute, which included a set of specific revisions to Regulation VIII. These revisions are reflected in the version of Regulation VIII adopted by ICAPCD on October 16, 2012 and approved by USEPA April 22, 2013. Since 2006, ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

FIGURE 4-1
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

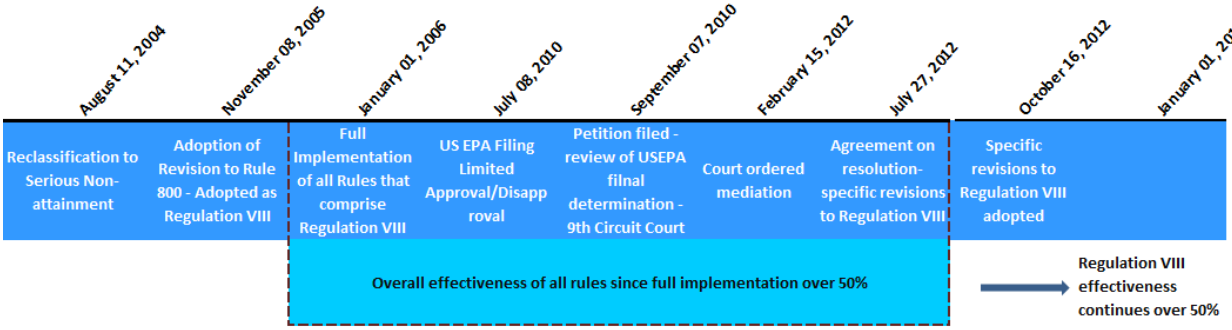


Fig 4-1: Regulation VIII Graphic Timeline

IV.1.a Control Measures

Below is a brief summary of Regulation VIII, which is comprised of seven fugitive dust rules. **Appendix D** contains a complete set of the Regulation VIII rules.

ICAPCD's Regulation VIII consists of seven interrelated rules designed to limit emissions of PM_{10} from anthropogenic fugitive dust sources in Imperial County.

Rule 800, General Requirements for Control of Fine Particulate Matter, provides definitions, a compliance schedule, exemptions and other requirements generally applicable to all seven rules. It requires the United States Bureau of Land Management (BLM), United States Border Patrol (BP) and DPR to submit dust control plans (DCP) to mitigate fugitive dust from areas and/or activities under their control. Appendices A and B within Rule 800 describe methods for determining compliance with opacity and surface stabilization requirements in Rules 801 through 806.

Rule 801, Construction and Earthmoving Activities, establishes a 20% opacity limit and control requirements for construction and earthmoving activities. Affected sources must submit a DCP and comply with other portions of Regulation VIII regarding bulk materials, carry-out and track-out, and paved and unpaved roads. The rule exempts single family homes and waives the 20% opacity limit in winds over 25 mph under certain conditions.

Rule 802, Bulk Materials, establishes a 20% opacity limit and other requirements to control dust from bulk material handling, storage, transport and hauling.

Rule 803, Carry-Out and Track-Out, establishes requirements to prevent and clean-up mud and dirt transported onto paved roads from unpaved roads and areas.

Rule 804, Open Areas, establishes a 20% opacity limit and requires land owners to prevent vehicular trespass and stabilize disturbed soil on open areas larger than 0.5 acres in urban areas, and larger than three acres in rural areas. Agricultural operations are exempted.

Rule 805, Paved and Unpaved Roads, establishes a 20% opacity limit and control requirements for unpaved haul and access roads, canal roads and traffic areas that meet certain size or traffic thresholds. It also prohibits construction of new unpaved roads in certain circumstances. Single-family residences and agricultural operations are exempted.

Rule 806, Conservation Management Practices, requires agricultural operation sites greater than 40 acres to implement at least one conservation management practice (CMP) for each of several activities that often generates dust at agricultural operations. In addition, agricultural operation sites must prepare a CMP plan describing how they comply with Rule 806, and must make the CMP plan available to the ICAPCD upon request.

IV.1.b Additional Measures

Imperial County Natural Events Action Plan (NEAP)

On August 2005, the ICAPCD adopted a NEAP for the Imperial County, as was required under the former USEPA Natural Events Policy, to address PM_{10} events by:

- Protecting public health;
- Educating the public about high wind events;
- Mitigating health impacts on the community during future events; and
- Identifying and implementing BACM measures for anthropogenic sources of windblown dust.

Smoke Management Plan (SMP) Summary

There are 35 Air Pollution Control Districts or Air Quality Management Districts in California, which are required to implement a district-wide smoke management program. The regulatory basis for California's Smoke Management Program, codified under Title 17 of the California Code of Regulations is the "Smoke Management Guidelines for Agricultural and Prescribed Burning" (Guidelines). California's 1987 Guidelines revised to improve interagency coordination, avoid smoke episodes, and provide continued public safety while providing adequate opportunity for necessary open burning. The revisions to the 1987 Guidelines approved March 14, 2001. All air districts, with the exception of the San Joaquin Valley Air Pollution Control District (SJAPCD) were required to update their existing rules and Smoke Management Plans to conform to the most recent update to the Guidelines.

Section 80150 of Title 17 specifies the special requirements for open burning in agricultural operations, the growing of crops and the raising of fowl or animals. This section specifically requires the ICAPCD to have rules and regulations that require permits that contain requirements that minimize smoke impacts from agricultural burning.

On a daily basis, the ICAPCD reviews surface meteorological reports from various airport agencies, the NWS, State fire agencies and CARB to help determine whether the day is a burn day. Using a four-quadrant map of Imperial County allowed burns are allocated in such a manner as to assure minimal to no smoke impacts safeguarding the public health. Finally, all permit holders are required to notice and advise members of the public of a potential burn. This noticing requirement is the Good Neighbor Policy. On June 26, 2014, declared a No Burn day, the ICAPCD did not receive any complaints related to agricultural burning. **Appendix A** contains copies of notices pertinent to the June 26, 2014 event.

IV.1.c Review of Source-Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around Brawley during the June 26, 2014 PM_{10} exceedance. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry, Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV

West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions. There were no complaints filed on June 26, 2014, officially declared as a No Burn day, related to agricultural burning, waste burning or dust.

FIGURE 4-2
PERMITTED SOURCES

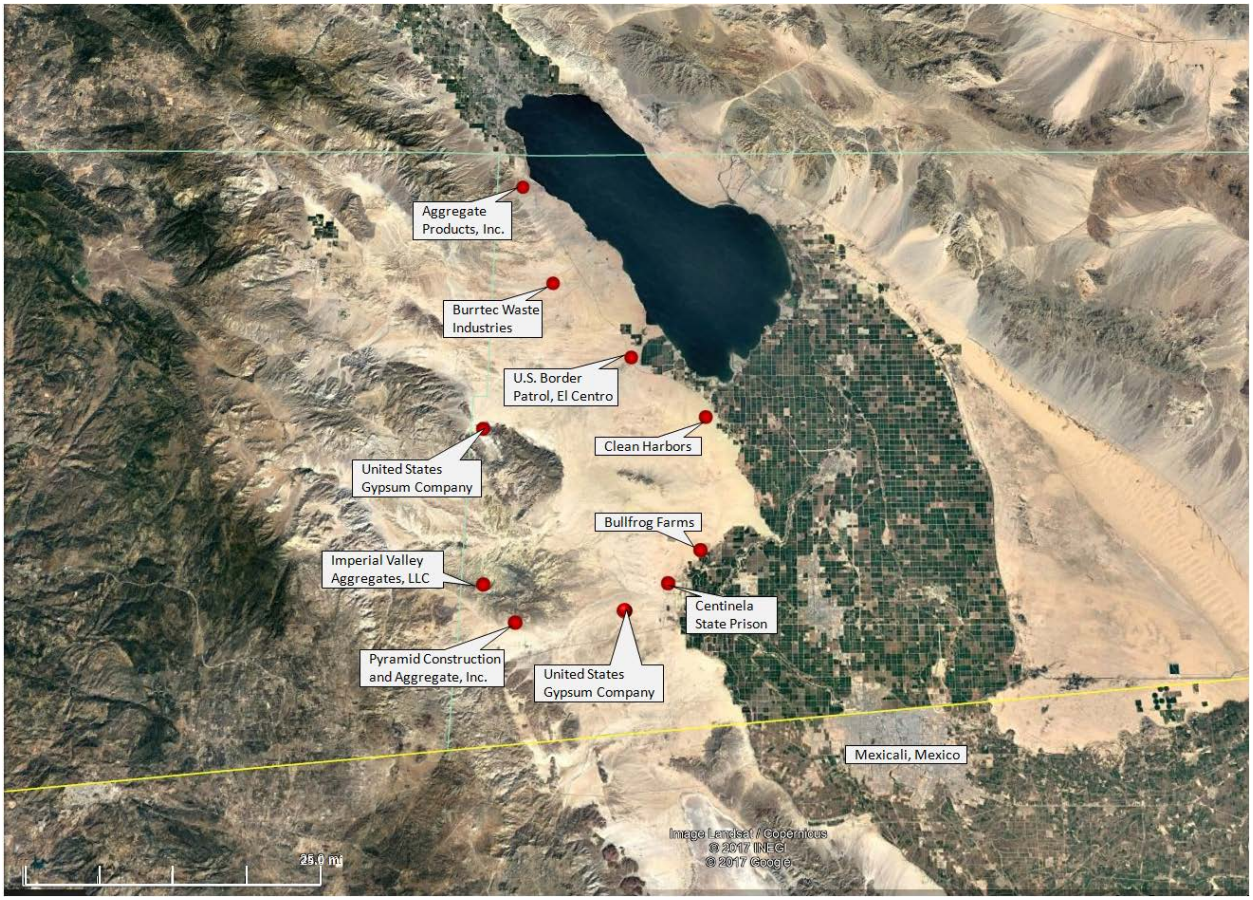


Fig 4-2: The above map identifies those permitted sources located west, northwest and southwest of the Brawley monitor. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition, either the Bureau of Land Management or the California Department of Parks manages the desert areas. Base map from Google Earth

FIGURE 4-3
NON-PERMITTED SOURCES

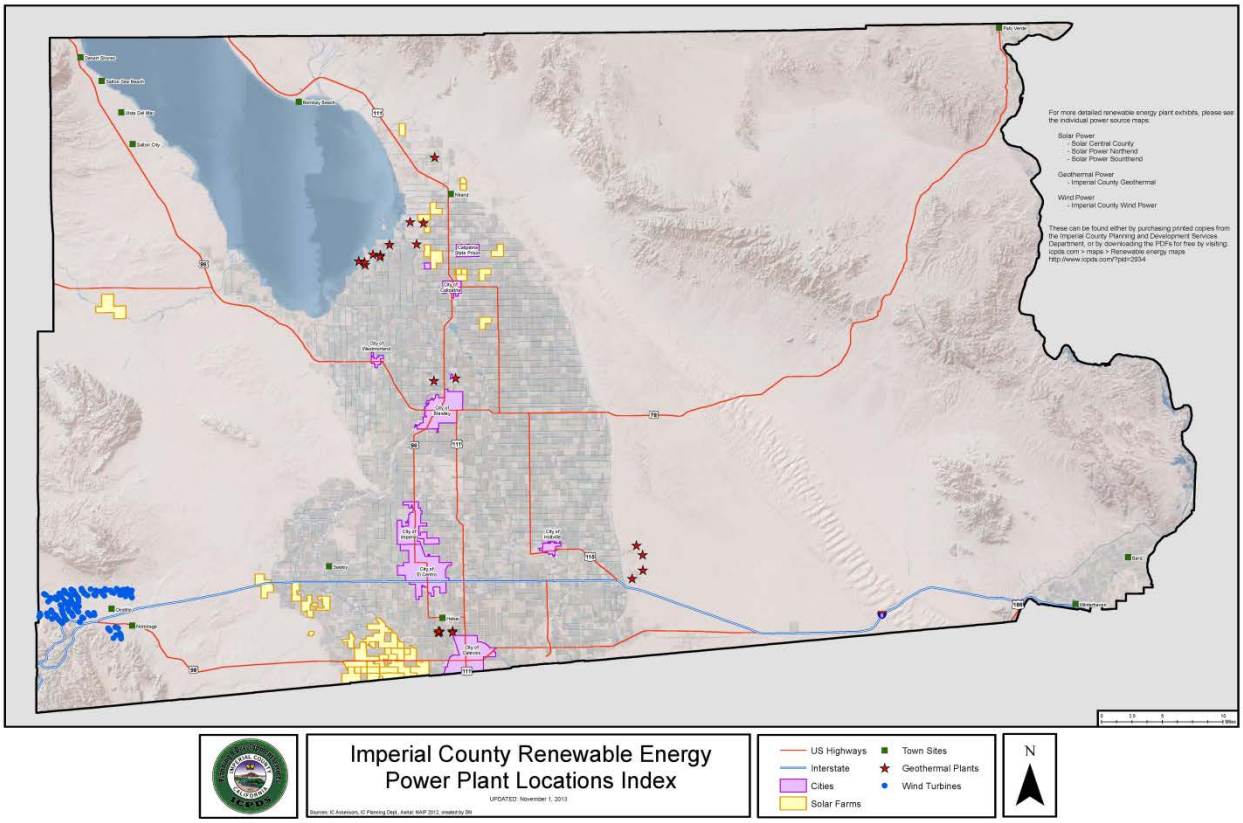


Fig 4-3: The above map identifies those power sources located west, northwest and southwest of the Brawley monitor. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

IV.2 Forecasts and Warnings

Forecasts of high winds for the region were issued by the NWS San Diego and Phoenix offices. The NWS Phoenix office issued a weather forecast on Thursday, June 26, 2014, warning of the potential for strong winds with wind speeds of between 15 and 25 mph, wind gusts of up to 35 mph for Imperial County. As mentioned above, the NWS San Diego office issued six Urgent Weather Message as early as June 25, 2014 that included wind advisories for areas west of Imperial County including the San Diego Mountains and deserts. Forecasted west winds of 20 to 30 mph, gusts up to 50 mph along with local gusts up to 60 mph were expected. Forecasted reduced visibility due to blowing dust and sand for Interstates 10, 8 and Highway 111 in southeastern San Diego County were included in the wind advisories.

The ICAPCD issued a web-based Air Quality Index[10] that tracked air quality during the day. At

[10] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone,

1100 pm the air quality level was identified as "Unhealthy for Sensitive Groups." This meant that PM_{10} levels were between 101 and 150 µg/m^3. This level carries the warning, "Be Advised: PM10 AQI 101-150 People with respiratory or heart disease, the elderly, and children are the groups most at risk, especially when they are physically active. There is an increased likelihood of respiratory symptoms in sensitive individuals, and aggravation of heart and lung disease and premature mortality in persons with cardiopulmonary disease and the elderly. U.S. EPA cautions that people with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion. **Appendix A** contains copies of pertinent notices to the June 26, 2014 event.

IV.3 Wind Observations

Wind data during the event were available from airports in eastern Riverside County, southern San Diego County, southwestern Yuma County (Arizona), northern Mexico, and Imperial County. Imperial County Airport and El Centro NAF both measured gusts of 30 mph or above on June 26. El Centro NAF measured five hours of winds at or above the 25-mph threshold. At one point, blowing dust was observed at the airport. See also **Table 2-2**. Wind speeds of over 25 mph are normally sufficient to overcome most PM_{10} control measures. During the June 26, 2014 event, wind speeds were above the 25-mph threshold overcoming the BACM in place.

IV.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that strong winds associated with a trough of low-pressure that moved into the Pacific Northwest and travelled across California and the Great Basin caused uncontrollable PM_{10} emissions. The BACM list as part of the control measures in Imperial County for fugitive dust emissions were in place at the time of the event. These control measures are required for areas designated as "serious" non-attainment for PM_{10}, such as Imperial County. Thus, the BACM in place at the time of the event were beyond reasonable. In addition, surface wind measurements in the Brawley and surrounding areas to the north and south of Brawley during the event were high enough (at or above 25 mph, with wind gusts over 30 mph) that BACM PM_{10} control measures would have been overwhelmed.

Finally, a high wind dust event may be a natural event, even when portions of the wind-driven emissions are anthropogenic so long as those emissions have a clear causal relationship to the event and are determined to be not reasonably controllable or preventable. This demonstration has shown that the event that occurred on June 26, 2014 was not reasonably controllable or preventable despite the strong and in force BACM within the affected areas in Imperial County. This demonstration has similarly established a clear causal relationship between the exceedance and the high wind event timeline and geographic location. Thus, the June 26, 2014 event is an exceptional event under the requirements of the exceptional event rule.

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particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health .Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://airnow.gov/index.cfm?action=aqibasics.aqi

V Clear Causal Relationship

V.1 Discussion

Meteorological observations for June 26, 2014 identified a trough of low-pressure that moved into the Pacific Northwest and travelled across California and the Great Basin. As the trough moved inland, the onshore flow increased deepening the pressure gradients creating gusty west winds in the mountains and deserts in San Diego County and into Imperial County.[11]

Entrained windblown dust from natural open areas, particularly from the desert areas west of the Brawley monitor, along with anthropogenic sources controlled with BACM, are confirmed by meteorological and air quality observations on June 26, 2014. The tightening of the pressure gradient caused the gusty westerly winds that affected air quality as evidenced by the six Urgent Weather messages issued by the San Diego NWS office, which warned of reduced visibility caused by blowing dust within the San Diego deserts west of Imperial County.

Figure 5-1 is a satellite image of Aerosol Optical Depth (AOD) or Aerosol Optical Thickness[12] using the Deep Blue Aerosol Angstrom Exponent, over Imperial County on June 26, 2014. While AOD alone does not confirm dust, since AOD may be composed of pollution from factories, smoke from fires, sea salt, volcanic ash, smog or dust, it does support other elements in place on June 26, 2014, such as measured elevated wind speeds, gusts, reduced visibility at airports and elevated concentrations of PM_{10} at the Niland and Brawley monitors.

[11] Area Forecast Discussion National Weather Service Phoenix AZ, 740 PM PST (840 PM MST), Thursday, June 26, 2014 and Areas Forecast Discussion National Weather Service San Diego CA, 807 PM PST (907 PM PDT), Thursday, June 26, 2014.

[12] Aerosol Optical Depth (AOD) (or Aerosol Optical Thickness) indicates the level at which particles in the air (aerosols) prevent light from traveling through the atmosphere. Aerosols scatter and absorb incoming sunlight, which reduces visibility. From an observer on the ground, an AOD of less than 0.1 is "clean" - characteristic of clear blue sky, bright sun and maximum visibility. As AOD increases to 0.5, 1.0, and greater than 3.0, aerosols become so dense that sun is obscured. Sources of aerosols include pollution from factories, smoke from fires, dust from dust storms, sea salt, and volcanic ash and smog. Aerosols compromise human health when inhaled by people, particularly those with asthma or other respiratory illnesses. **The MODIS Deep Blue Aerosol Ångström Exponent** layer can be used to provide additional information related to the aerosol particle size over land. This layer is created from the Deep Blue (DB) algorithm, originally developed for retrieving over desert/arid land (bright in the visible wavelengths). The Ångström exponent provides additional information on the particle size (larger the exponent, the smaller the particle size). Values < 1 suggest optical dominance of coarse particles (e.g. dust) and values > 1 suggest optical dominance of fine particles (e.g. smoke) https://worldview.earthdata.nasa.gov; The Ångström Exponent (denoted as AE or α) is a measure of how the AOD changes relative to the various wavelength of light (known as 'spectral dependence'.) This is related to the aerosol particle size. Roughly speaking, values less than 1 suggest an optical dominance of coarse particles (e.g. dust, ash, sea spray), while values greater than one 1 dominance of fine particles (e.g. smoke, industrial pollution); Source: https://worldview.earthdata.nasa.gov. and https://deepblue.gsfc.nasa.gov/science

FIGURE 5-1
SUSPENDED AEROSOLS OVER IMPERIAL COUNTY

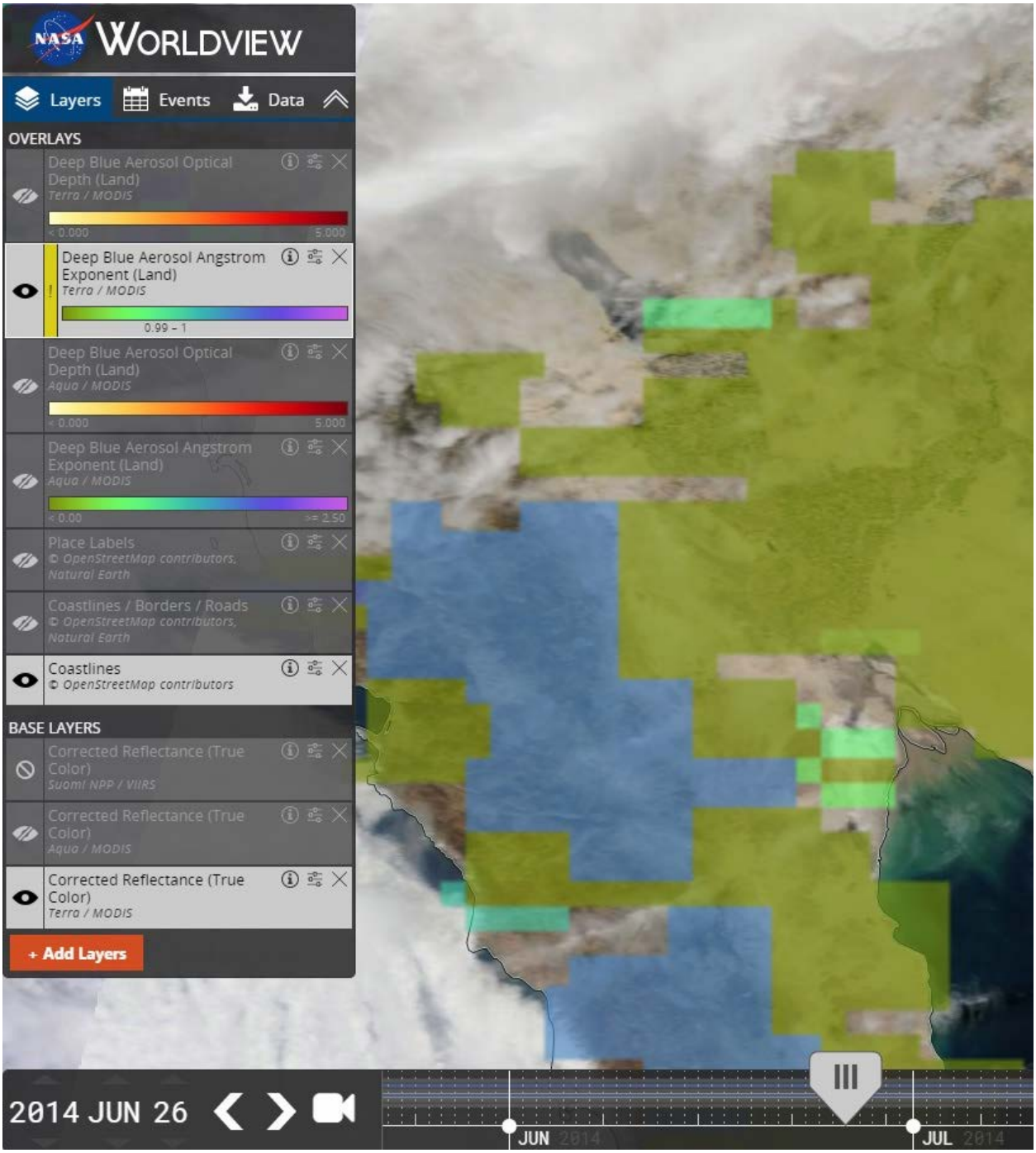

Fig 5-1: A MODIS Terra satellite image captured an extensive amount of aerosols drifting over the region. Warmer colors indicate particle size. Image through NASA's Worldview portal

Figure 5-2 shows the tightening of the pressure gradient over the region as the trough of low pressure deepened. The packing of the gradient translates into the period when winds and gusts

were at their greatest over the region, and during the period, that Brawley's hourly PM_{10} was the most elevated.

FIGURE 5-2
CONUS INFRARED SATELLITE IMAGE JUNE 26, 2014

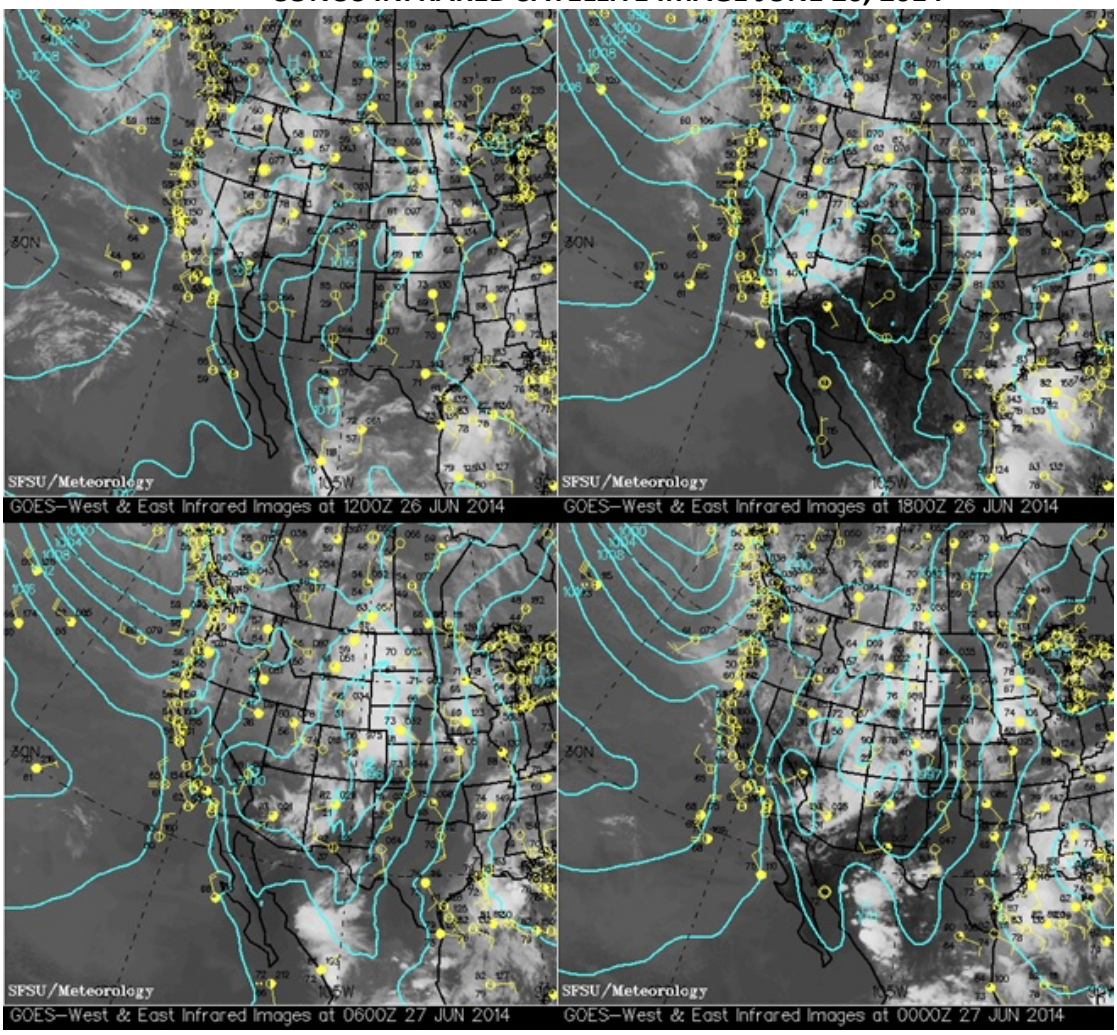

Fig 5-2: GOES E-W infrared satellites show the tightening of the pressure gradient over the region that led to the gusty winds. Clockwise, from top left: 0400 PST; 1000 PST; 1600 PST and 2200 PST June 26, 2014. As mentioned above, in section II, at 1500 PST, wind direction shift along with an associated increase in winds speeds and gust that corresponded with elevated concentrations of PM_{10}. Source: SFSU Department of Earth & Climate Sciences, and the California Regional Weather Server

The EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states. [13] **Table 5-1** provides a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at the exceeding stations. As illustrated in **Table 5-1**,

[13] "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

hourly time slots for the Brawley monitor with elevated PM_{10} concentrations (shown in red bold text) are strongly correlated to high average wind speeds and high-speed gusts (typically above 25 mph) at nearby regional meteorological stations, indicating these elevated wind speeds caused an exceedance of the NAAQS at the Brawley monitor on June 26, 2014.

TABLE 5-1
WIND SPEEDS AND PM_{10} CONCENTRATIONS FOR BRAWLEY JUNE 26, 2014

SUNRISE-OCOTILLO				EL CENTRO NAF				IMPERIAL COUNTY AIRPORT				BRAWLEY FEM	
HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	PM_{10} (µg/m³)
0	10	14	219	0	3		190	0	0		0	0	38
100	10	16	209	100	6		130	100	0		0	100	71
200	9	15	210	200	6		150	200	7		160	200	75
300	10	14	220	300				300	0		0	300	72
400	3	7	227	400	3		100	400	3		110	400	91
500	4	7	240	500				500	7		130	500	78
600	5	11	243	600	**6**		130	600	**7**		130	600	**107**
700	2	4	282	700	**5**		130	700	**3**		120	700	**146**
800	8	10	70	800	3		VAR	800	0		0	800	87
900	7	10	47	900	5		100	900	3		210	900	43
1000	6	11	67	1000	6		130	1000	5		280	1000	47
1100	2	6	131	1100	8		140	1100	3		VAR	1100	37
1200	16	23	329	1200	3		VR	1200	6		270	1200	40
1300	12	22	255	1300	6		260	1300	0		0	1300	31
1400	13	25	249	1400	22		280	1400	16	26	290	1400	38
1500	11	24	243	1500	**25**		280	1500	**14**	22	300	1500	**421**
1600	13	23	240	1600	**25**		280	1600	**21**	30	280	1600	**741**
1700	22	28	224	1700	**23**		270	1700	**18**		280	1700	**725**
1800	12	18	248	1800	**23**	30	250	1800	**20**		250	1800	**223**
1900	9	17	253	1900	**18**		240	1900	**21**		250	1900	**112**
2000	7	19	227	2000	**25**	33	240	2000	**17**	25	260	2000	**175**
2100	14	24	243	2100	**29**	34	250	2100	**17**	26	260	2100	**203**
2200	19	31	260	2200	**26**		240	2200	**22**		260	2200	**683**
2300	24	34	258	2300	**24**	32	240	2300	**21**	31	260	2300	**166**

Table 5-1: Wind speed, wind gust, and wind direction tables for Ocotillo Wells, El Centro NAF, and Imperial County Airport comparative to the concentration of the Brawley monitor on June 26, 2014. Values indicated in red are wind speed values coincident with the Brawley FEM Monitor measured PM_{10} concentrations above 100 µg/m³. Collected meteorological observations are from a variety of sources with varying equipment and exposure. **Appendix B** contains additional information regarding meteorological observations

The wind event began on June 25 when gusty winds measured at Ocotillo Wells and Sunrise-Ocotillo lofted dust to the west of Imperial Valley. The wind event was also regional. **Figure 5-**

3 is an overview of events leading up to the exceedance measured by the Brawley hourly FEM PM_{10} monitor on June 26, 2014.

Figure 5-3 is a graphical depiction that provides a detailed analysis of meteorological events leading up to the exceedance measured by the Brawley monitor on June 26, 2014. As explained in section II, a trough of low-pressure moved inland and as it moved through California and into the Great Basin, pressure gradients deepened causing westerly winds within the mountains and deserts of San Diego County and into Imperial County. During the early morning hours of June 26, 2014 wind, predominantly from the south, southwest were moderately low as were concentrations of PM_{10} (**Figure 2-20**). By 1500, winds shifted to a predominantly west direction allowing for elevated winds speeds as measured at the El Centro NAF Facility (KNJK) and Imperial County airports, to entrain windblown dust from the San Diego mountains and desert slopes.

Sites located within the San Diego Mountains confirm the increase in wind speeds and gusts during the late afternoon to evening hours. In addition, local airports reported blowing dust with reduced visibility. By 2100, wind speeds and gusts remained elevated into the early morning hours of June 27, 2014. The El Centro NAF (KNJK) measured five hours of winds at or above 25 mph. The Imperial County Airport (KIPL) measured eight hours of gusts between 22mph and 31mph. Gusty winds as measured by upstream sites carried windblown dust from the mountain and desert slopes of San Diego County into Imperial County causing an exceedance at the Brawley monitor on June 26, 2014.

FIGURE 5-3
TIME SEQUENCE OF ENTRAINMENT JUNE 26, 2014

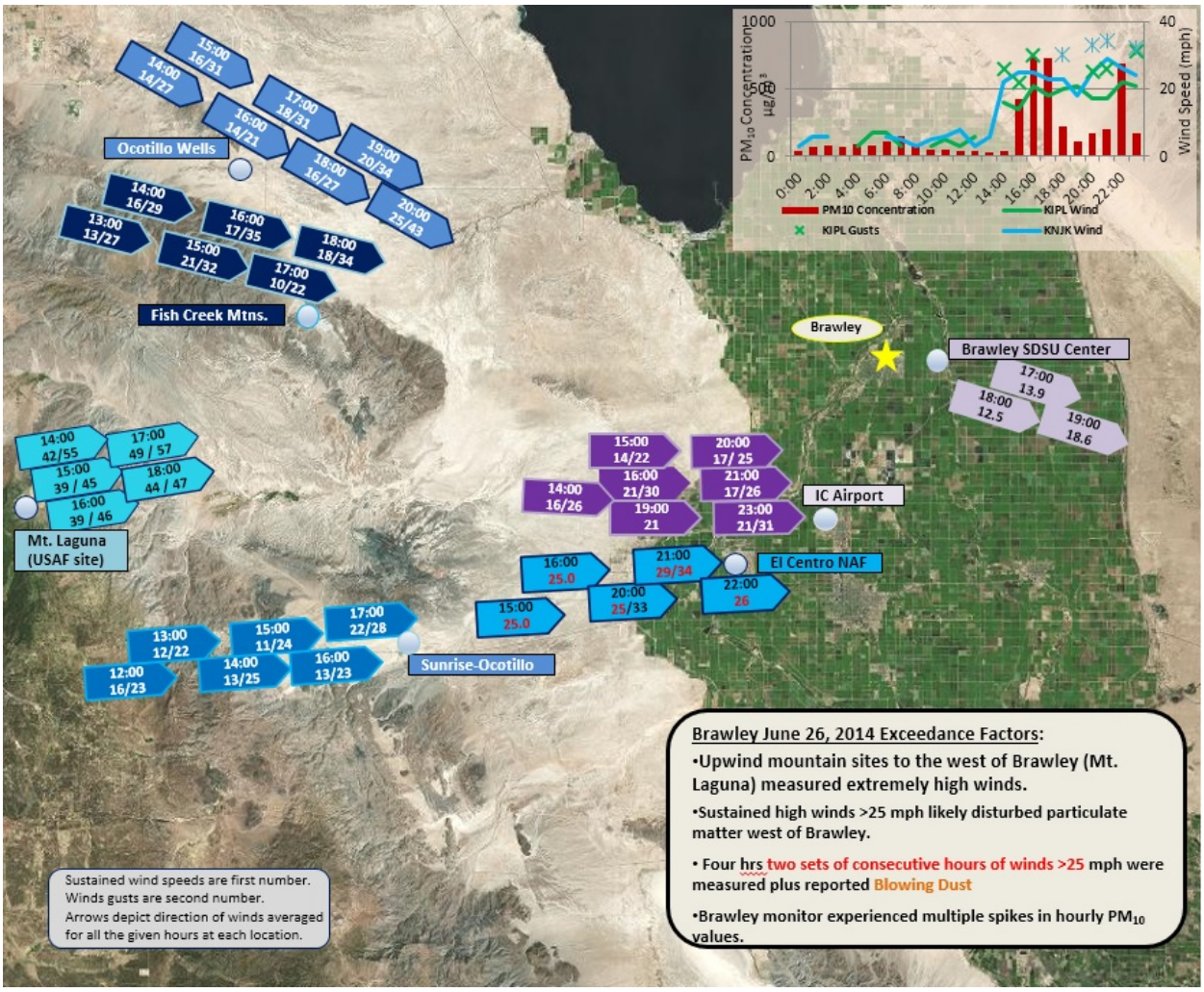

Fig 5-3: As wind shifted to a predominantly west direction during June 26, 2014 upstream wind speeds played a critical role in transporting windblown dust into Imperial County

Figure 5-4 is a three-day graphical depiction of the wind speeds throughout Imperial County from June 25, 2014 through June 27, 2014.[14] The consistency for all stations is evident. For June 26, 2014, all stations measured elevated wind speeds by 1500 PST. As the system continued moving inland wind speeds remained elevated through the rest of the day. Winds started to diminish during early morning hours on June 27, 2014.

[14] National Weather Service; NOAA's Glossary – Wind Speed: The rate at which air is moving horizontally past a given point. It may be a 2-minute average speed (reported as wind speed) or an instantaneous speed (reported as a peak wind speed, wind gust, or squall); http://w1. weather. gov/glossary/index. php?letter=w

FIGURE 5-4
72 HOUR WIND COMPARISON OF REGIONAL SITES

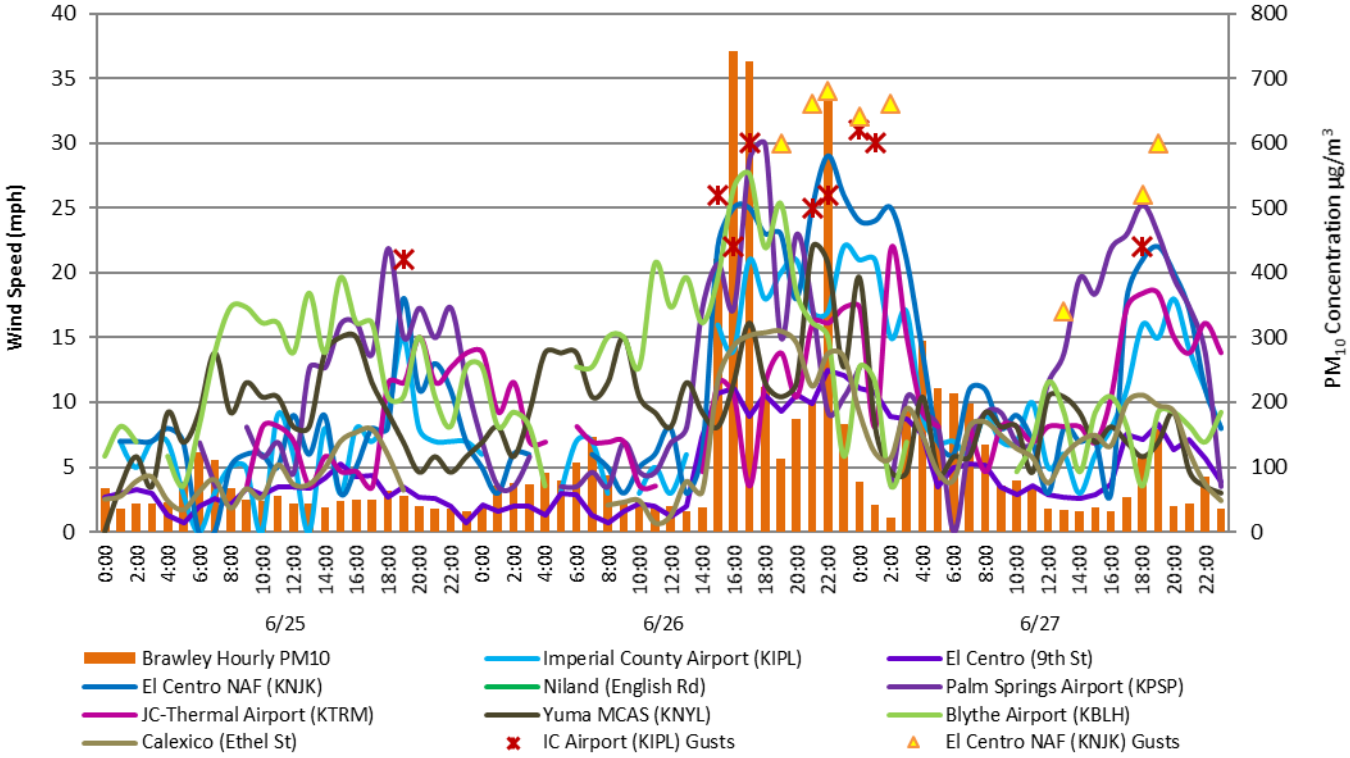

Fig 5-4: Meteorological data collected from eleven sites within Imperial, Riverside, and Yuma counties over a three-day period from June 25, 2014 to June 27, 2014 shows a uniform spike in wind speed during the June 26, 2014 exceptional event

Figure 5-5 demonstrates the relationship between the high winds and the transported windblown dust. The correlation of hourly PM_{10} data from the Brawley air monitor and the elevated wind speeds on June 26, 2014 indicate that as wind speeds increased so did concentrations of PM_{10}. The highest hourly PM_{10} concentrations occurred throughout the afternoon and evening hours of June 26, 2014 coincident with the elevated winds and gusts measured at the different stations in Imperial County. **Appendix C** contains additional graphs illustrating the relationship between the high PM_{10} concentrations and elevated wind speeds from other monitoring sites within Imperial and Riverside counties on June 26, 2014**.**

FIGURE 5-5
BRAWLEY
PM_{10} CONCENTRATIONS AND WIND SPEED CORRELATION JUNE 26, 2014

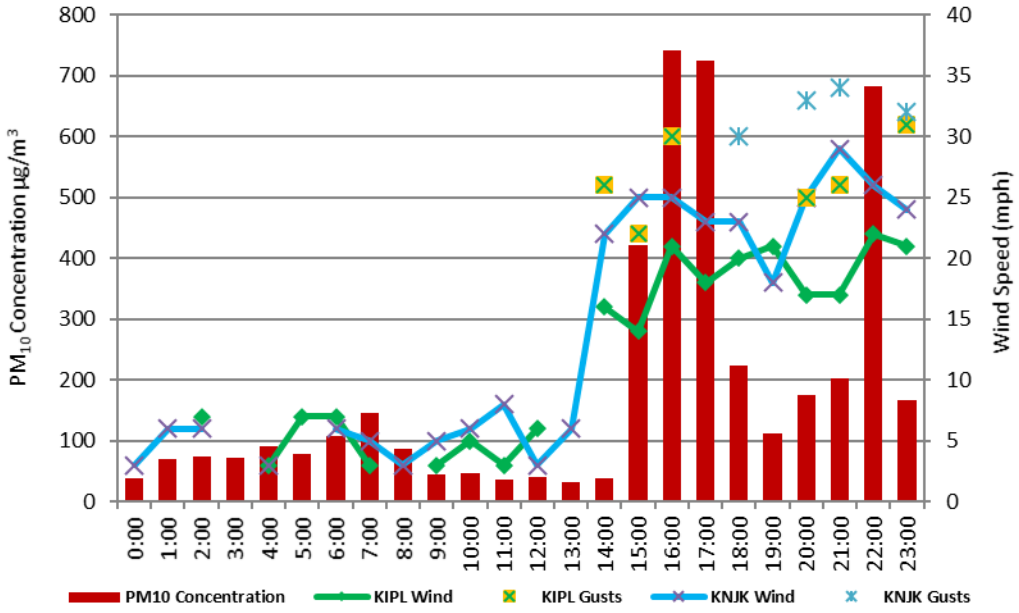

Fig 5-5: Brawley PM_{10} concentrations increased following high winds and gusts at Imperial Airport (KIPL) and El Centro NAF (KNJK). Air quality data is from the EPA's AQS data. Wind data is from the NCEI's QCLCD system

Figure 5-6 is a three-day depiction, June 25, 2014 through June 27, 2014, of the measured PM_{10} concentrations at the Brawley monitor. For the morning and early afternoon hours on June 26, 2014, the Brawley monitor measured reduced levels of concentrations, as winds remained light. However, as winds increased during the afternoon on June 26, 2014 so did concentrations. PM_{10} concentrations stayed elevated throughout the evening on June 26, 2014. As winds subsided back to relatively light conditions during the early morning hours on June 27, 2014 so did concentrations.

FIGURE 5-6
BRAWLEY
72 HOUR PM_{10} CONCENTRATIONS AND WIND SPEED CORRELATION

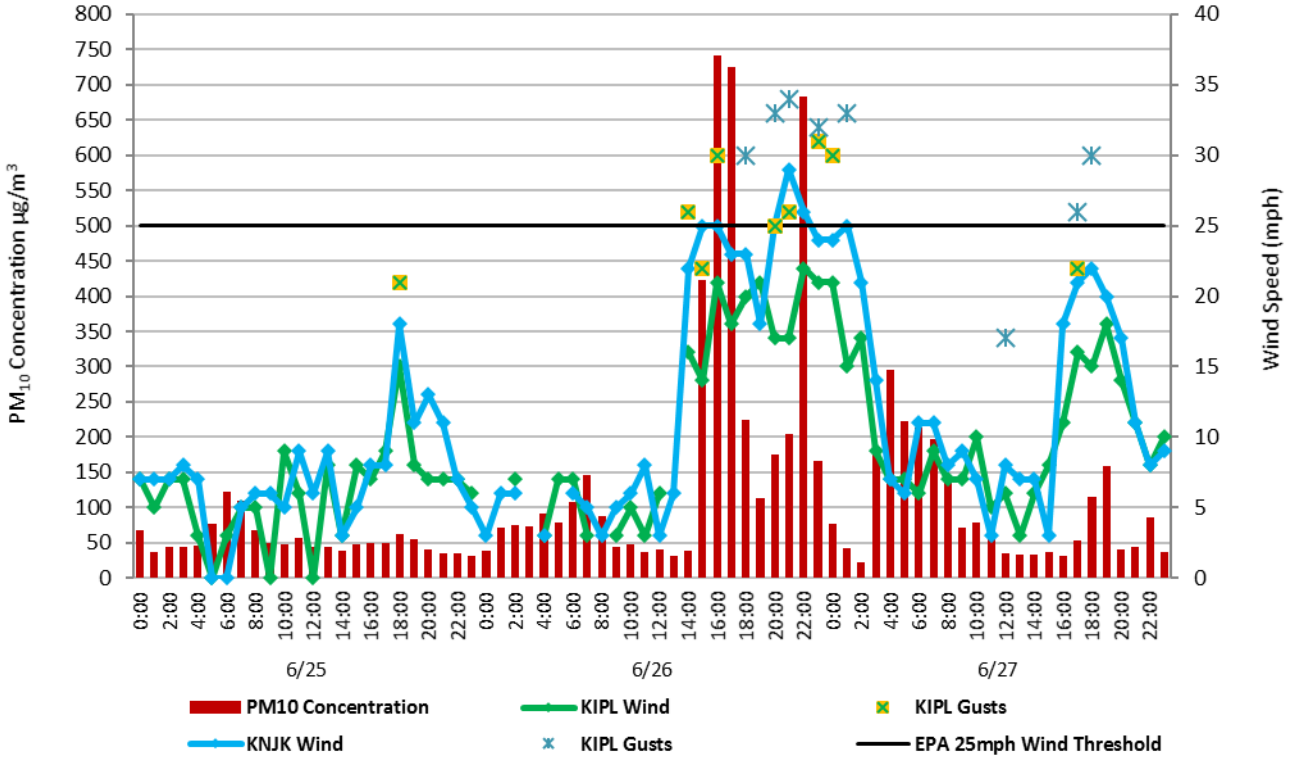

Fig 5-6: This graph illustrates the concentration levels, wind speeds, and gusts for three days, June 25, 2014 through June 27, 2014 for the Brawley monitor. Brawley PM_{10} concentrations increased following high winds and gusts at Imperial Airport (KIPL) and El Centro NAF (KNJK). Air quality data is from the EPA's AQS data. Wind data is from the NCEI's QCLCD system

In order to understand the totality of the regional impact and the impact to the Brawley monitor **Figure 5-7** is a three day depiction, June 25, 2014 through June 26, 2014, of the PM_{10} measured concentrations at stations located upwind of Brawley. For June 25, 2014 and the morning hours on June 26, 2014 all stations show low levels of concentrations as winds remained light. However, as winds increased during the afternoon on June 26, 2014 concentrations show a similar increase. As the winds continued through the rest of the day, the concentrations picked up during the afternoon and evening hours on June 26, 20014. As winds subsided back to relatively light conditions by noon on June 27, 2014 so did concentrations.

FIGURE 5-7
72 HOUR PM_{10} CONCENTRATIONS AND WIND SPEEDS REGIONAL SITES

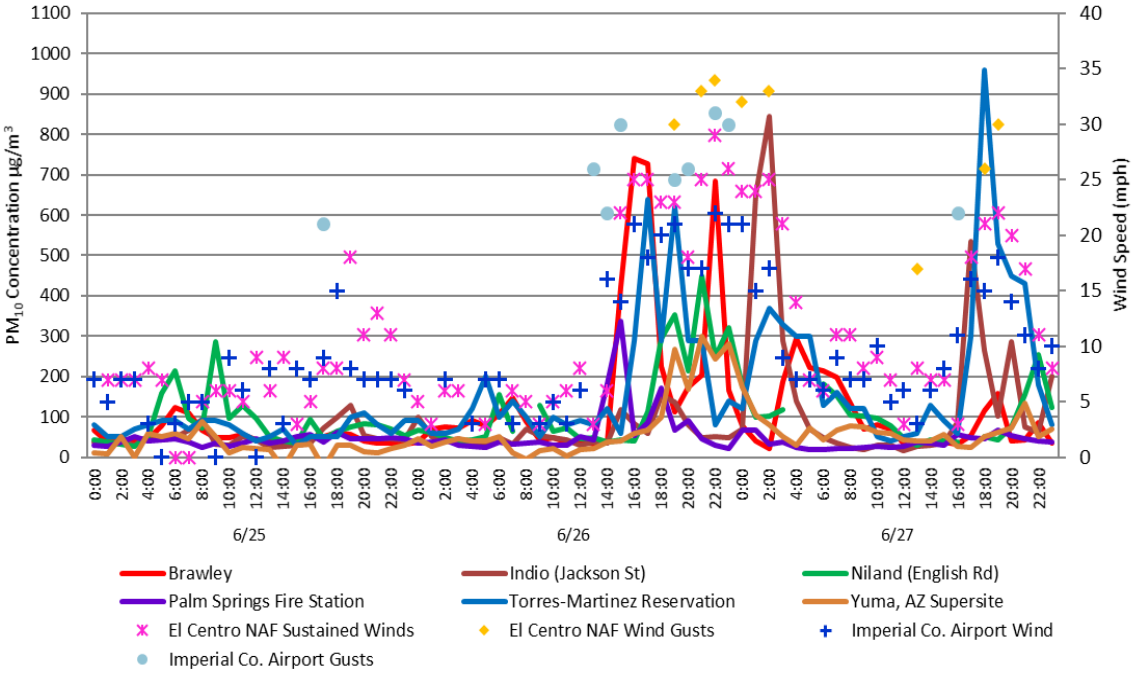

Fig 5-7: This graph illustrates the concentration levels, wind speeds, and gusts for three days, June 25, 2014 through June 27, 2014 for various monitoring sites. Included in the graph are some upwind and downwind monitors. All stations/monitors show a comparable pattern between the elevated wind speeds and concentrations. Air quality data is from the EPA's AQS data. Wind data is from the NCEI's QCLCD system

FIGURE 5-8
72 HOUR TIME SERIES PM_{10} CONCENTRATIONS AND VISIBILITY
EL CENTRO NAF (KNJK)

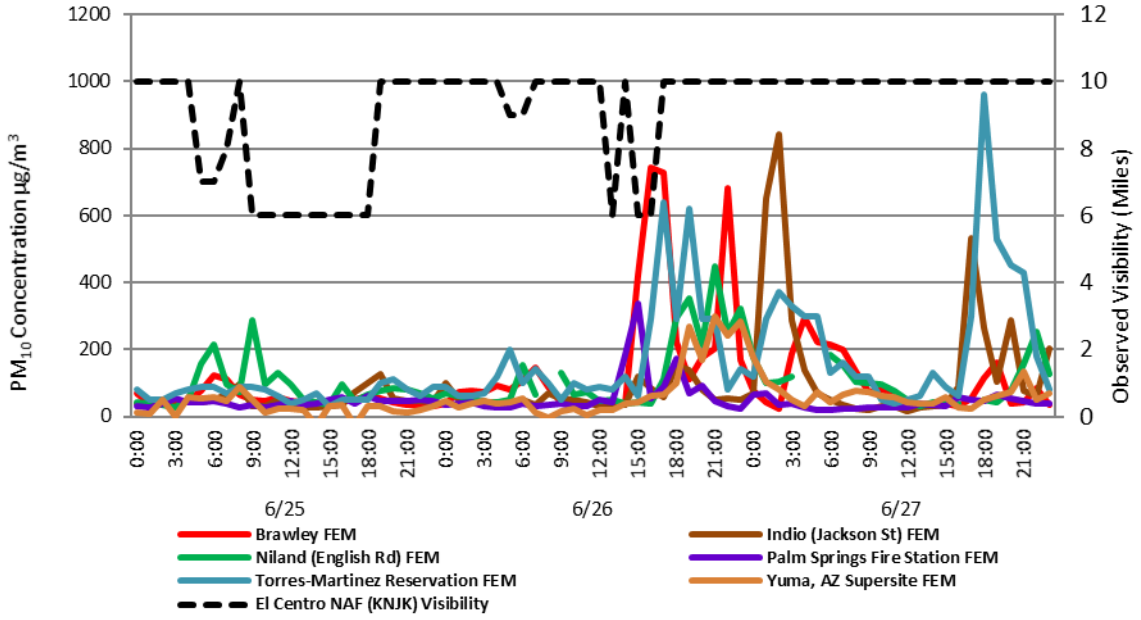

Fig 5-8: Visibility, as reported from the El Cento NAF (KNJK) reduced to six miles at the airport at 1456 PST. Air quality data is from the EPA's AQS data. Visibility data is from the NCEI's QCLCD system

In anticipation of the arrival of a trough with a fairly strong shortwave, the San Diego NWS office issued six (6) Urgent Weather Messages containing wind advisories in and around the San Diego Mountain passes and deserts as early as Tuesday June 24, 2014.[15] The advisories identified areas along Coachella Valley and Interstate 8, which included winds 20 to 30 mph and reduced visibility due to blowing dust and sand. A useful measurement of the degradation of air quality is the Air Quality Index (AQI).[16]

Figure 5-9 provides the resultant AQI for June 26, 2014. As the trough moved through the area with strong onshore flow the level of reduced air quality became evident when the AQI level changed from a "Yellow" or Moderate level to an "Orange" or "Unhealthy for Sensitive Groups" level. The lower air quality affirms that on June 26, 2014 gusty west winds transported windblown dust into Imperial County affecting air quality.

[15] Area Forecast Discussion National Weather Service San Diego CA, 845 PM PST (945 PM PDT), Tuesday, June 24, 2014.
[16] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country.

FIGURE 5-9
AIR QUALITY INDEX FOR BRAWLEY JUNE 26, 2014

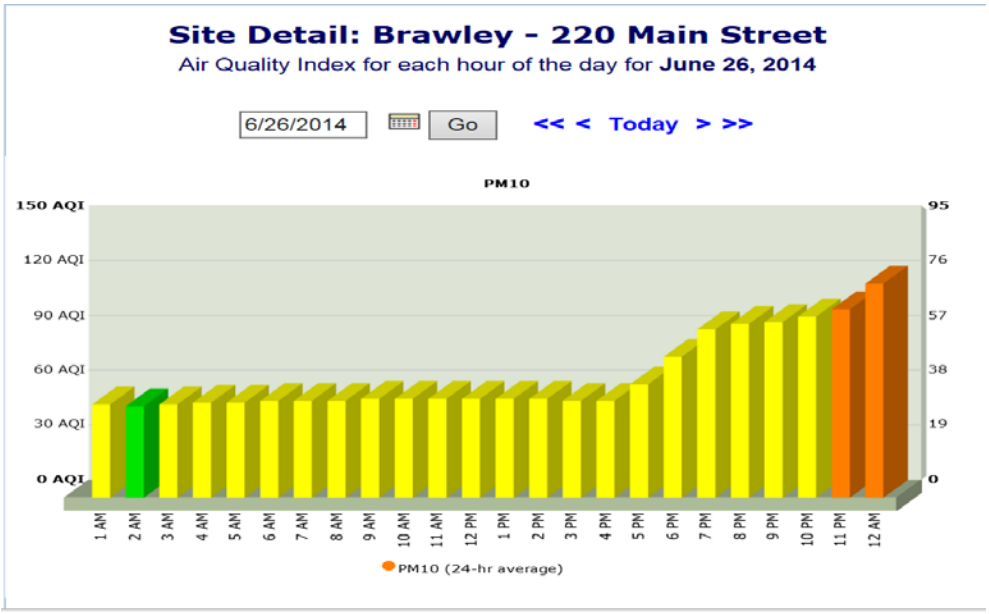

Fig 5-9: Demonstrates that air quality in Imperial County was affected when high winds associated with a trough of low pressure moved inland and moved eastward through California and into the Great Basin on June 26, 2014. As the trough of low pressure moved inland and across California, a deepening of the low-pressure gradients caused westerly winds in the mountains and deserts of San Diego County that transported windblown dust into Imperial County affecting air quality and causing an exceedance at the Brawley monitor

V.2 Summary

The preceding discussion, graphs, figures and tables provide wind direction, speed and concentration data illustrating the spatial and temporal effects of the gusty westerly winds associated with the passing of a trough with strong onshore flow through California and into the Great Basin. The information provides a clear causal relationship between the transported windblown dust and the PM_{10} exceedance measured at the Brawley monitor on June 26, 2014. Furthermore, the issued Urgent Weather Messages and the air quality alert illustrate the effect upon air quality within the region extending from all of Imperial County and the southern portion of Riverside County to Yuma, Arizona. Large amounts of coarse particles (dust) and PM_{10} transported by gusty westerly winds into the lower atmosphere originated within the mountain and desert areas of San Diego County and into Imperial County. Combined, the information demonstrates that the elevated PM_{10} concentration measured on June 26, 2014 coincided with high wind speeds over the southern portion of Riverside County, all of Imperial County, and portions of western Arizona affected air quality.

FIGURE 5-10
JUNE 26, 2014 WIND EVENT TAKEAWAY POINTS

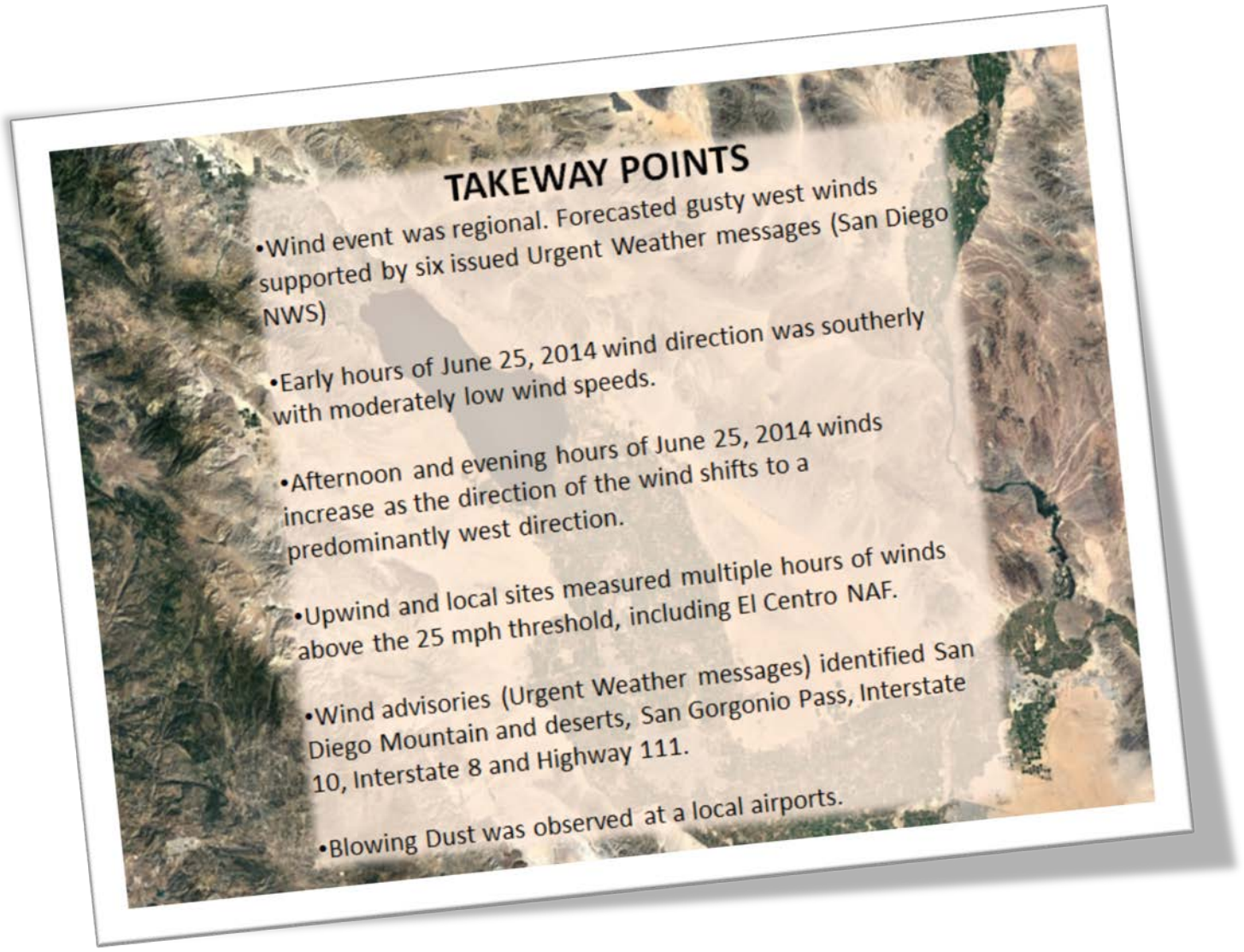

Fig 5-10: Illustrates the factors that qualify the June 26, 2014 natural event which affected air quality as an Exceptional Event

VI Conclusions

The PM_{10} exceedance that occurred on June 26, 2014, satisfies the criteria of the EER, which states, that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

	TABLE 6-1 TECHNICAL ELEMENTS CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})	DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)	5-28
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation	42-54
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section	29-33
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	34-41
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	34-41: 42-54

VI.1 Affects Air Quality

The preamble to the revised EER states that an event has affected air quality if the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section V, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the June 26, 2014 event, which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 40 CFR Part 50 defines an exceptional event as an event that must be "not reasonably controllable or preventable" (nRCP). The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. A natural wind event, which transports dust from natural open deserts, meets the nRCP, when sources are controlled by BACM and when human activity plays little to no direct causal role. This demonstration provides evidence that despite BACM in place within Imperial County, high winds overwhelmed all BACM controls where human activity played little to no direct causal role. The

PM_{10} exceedance measured at the Brawley monitor caused by naturally occurring strong gusty west winds transported windblown dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert regions to the west and southwest of Imperial County. These facts provide strong evidence that the PM_{10} exceedance at Brawley on June 26, 2014, were not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a "Natural Event" (50.1(k) of 40 CFR Part 50), which may recur at the same location, is an event where human activity plays little or no direct causal role. The criteria that human activity played little or no direct causal role occurs when the event, along with its resulting emissions, are solely from natural sources or where all significant anthropogenic sources of windblown dust have been reasonably controlled. As discussed within this demonstration, windblown dust anthropogenic sources reasonably controlled with BACM in and around Brawley on June 26, 2014 meet the criteria that human activity played little or no direct causal role therefore, the event qualifies as a natural event.

VI.4 Clear Causal Relationship

The time series plots of PM_{10} concentrations at Brawley during different days, and the comparative analysis of different monitors in Imperial and Riverside counties demonstrates a consistency of elevated gusty westerly winds and concentrations of PM_{10} on June 26, 2014 (Section V). In addition, these time series plots and graphs demonstrate that the high PM_{10} concentrations and the gusty westerly winds were an event that was widespread, regional and not preventable. Arid conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by the elevated gusty westerly winds. Days immediately before and after the high wind event PM_{10} concentrations were well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the windblown dust emissions to the exceedance on June 26, 2014.

VI.5 Historical Concentrations

The historical annual and seasonal 24-hr average PM_{10} concentrations measured at the Brawley monitor were historically unusual compared to a multi-year data set (Section III).

Appendix A: Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

This section contains issued notices by the NWS and Imperial County pertinent to the June 26, 2014 event. Along with NWS notices, this Appendix contains any issued air quality alerts. Air quality alerts advise sensitive receptors of potentially unhealthy conditions in Imperial County resulting from a natural event. On June 26, 2014, the data illustrates a region-wide increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in Imperial County.

Appendix B: Meteorological Data

This Appendix contains the time series plots, graphs, wind roses, etc. for selected monitors in Imperial and Riverside counties along with other pertinent graphs, time series plots for other areas if applicable. These plots, graphs and tables demonstrate the regional impact of the wind event.

Appendix C: Correlated PM_{10} Concentrations and Winds

This Appendix contains the graphs depicting the correlations between PM_{10} Concentrations and elevated wind speeds for selected monitors within Imperial, Riverside, San Diego, and Yuma counties if applicable. Other areas are also included if applicable such as Mexico. These graphs demonstrate the region wide impact of the wind event.

Appendix D: Regulation VIII – Fugitive Dust Rule

This Appendix contains a description of the compilation of the BACM adopted by the ICAPCD and approved by the USEPA. Seven rules numbered 800 through 806 comprise the set of Regulation VIII Fugitive Dust Rules.